ORDER NO. KMF0009218S8

Service Manual

Multi-Function Laser FAX

Subject : Change of Cabinet,
Mechanical and Electrical Parts Location

KX-FLM600E / KX-FLM600AL / KX-FLM600NZ / KX-FLM600G / KX-FLM600PD / KX-FLM600JT / KX-FLM600FR / KX-FLM600SA / KX-FLM600SP / KX-FLM600TK

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

1. REPLACEMENT PARTS LIST(S)

1.1. REFERENCE CHART

Reason for Change

*The following items (1-8) indicate the reason for change. See the "**Notes**" colum for each part in **1.2. ORIGINAL AND NEW PARTS COMPARISON LIST(S)**.

1. Improve performance	Note: a:Improvement for recording paper feed.
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability code

The following items (1-8) indicate the reason for change. See the "Notes**" colum for each part in **1.2. ORIGINAL AND NEW PARTS COMPARISON LIST(S)**.

	Parts	Set Production	
V	Original New	Early (before change) Late (after change)	Original or new parts may be used in early or late production sets. Use original parts until exhausted, then stock new parts.
W	Original New	Early (before change) Late (after change)	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
X	Original New	Early (before change) Late (after change)	New parts only may be used in early or late production sets. Stock new parts.
Y	Original New	Early (before change) Late (after change)	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
Z	Other		

Note:

Alphabets in the “Remarks“ column in the following lists correspond to the alphabets in the “Remarks“ in 1.1. REFERENCE CHART.

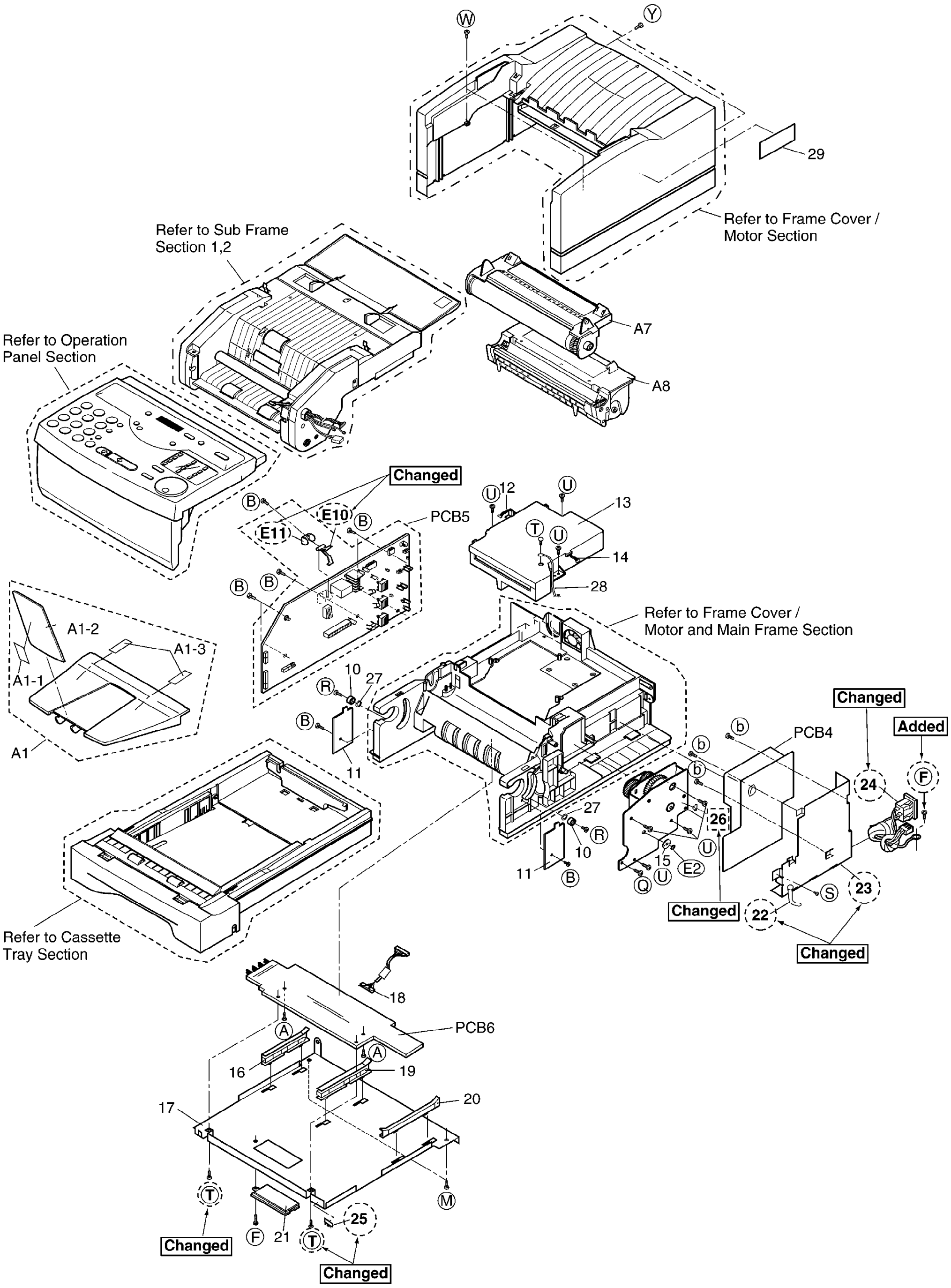
1.2. ORIGINAL AND NEW PARTS COMPARISON LIST(S)

1.2.1. KX-FLM600SA/KX-FLM600JT/KX-FLM600TK

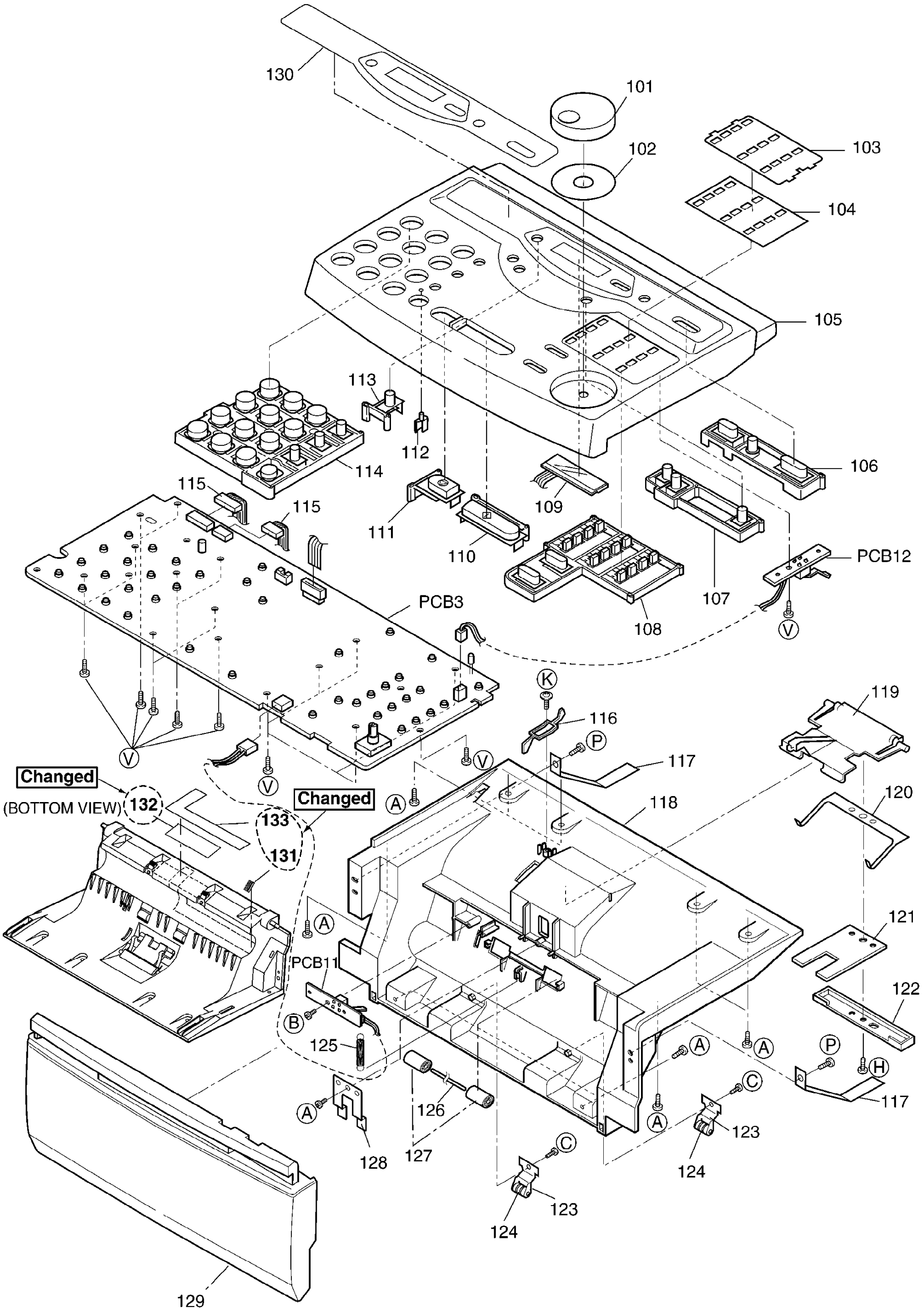
Ref. No.	Part No.		Part Name & Description	Pcs / Set	Remarks
	Original Part No.	New Part			
CABINET/MECHANICAL/ELECTRICAL PARTS					
368	PFQT1163Z	----------	LABEL, DTS (only KX-FLM600SA)	0	
ACCESSORIES AND PACKING MATERIALS					
A10	PQJP3T30Y	----------	PLUG, TEL (only KX-FLM600JT)	0	
HIGH VOLTAGE POWER SUPPLY BOARD PARTS					
E10	C60-01510	C60-01340	LEVER, COVER OPEN (only KX-FLM600TK)	1	
E11	C60-01340	C60-01510	GUIDE, COVER OPEN (only KX-FLM600TK)	1	

2. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

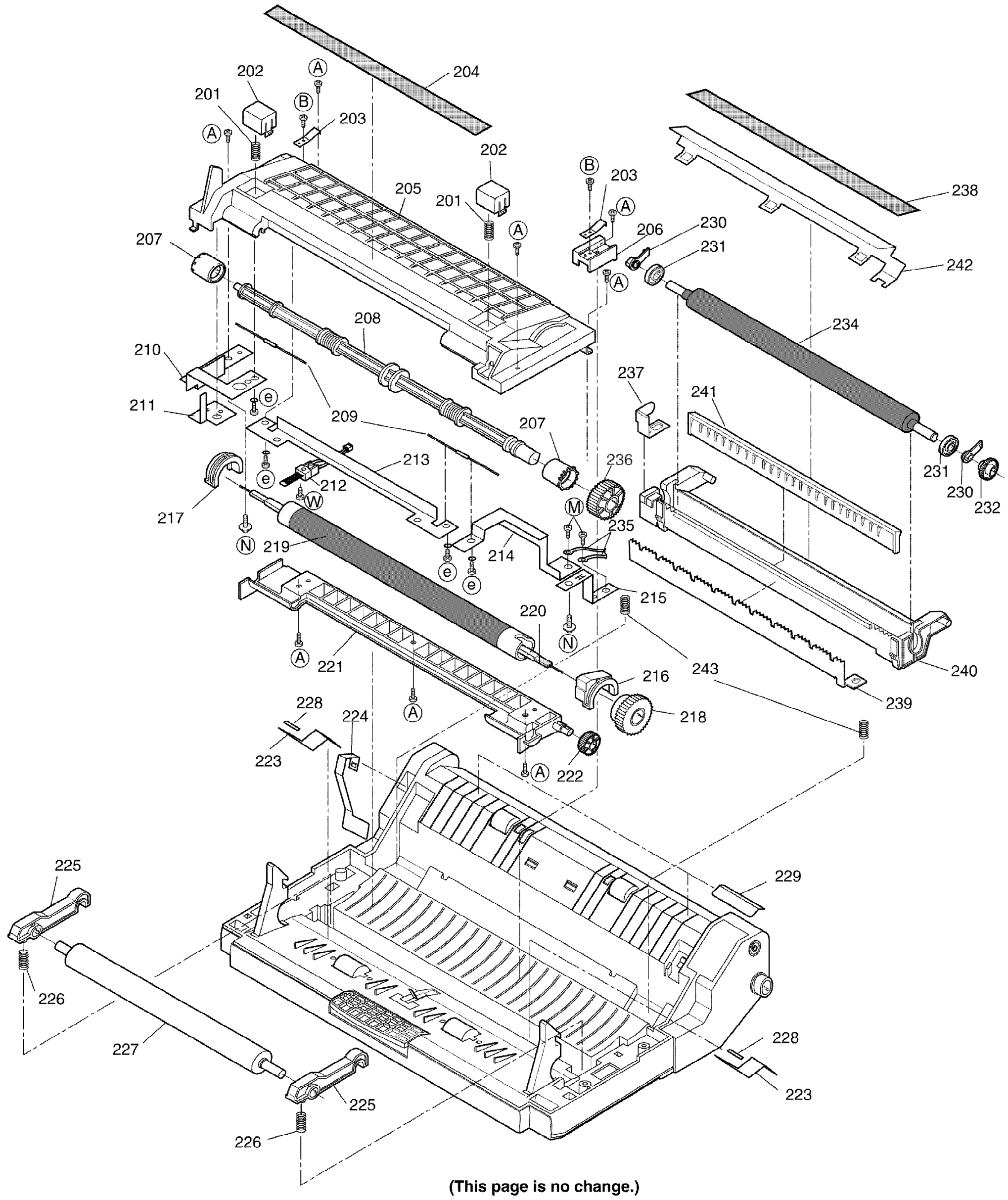
2.1. GENERAL SECTION


W
Y
29
Refer to Frame Cover / Motor Section
Refer to Sub Frame Section 1,2
A7
A8
Refer to Operation Panel Section
Changed
B
E10
E11
B
PCB5
U
12
U
13
T
U
14
28
B
B
Refer to Frame Cover / Motor and Main Frame Section
A1-2
A1-3
A1-1
A1
10
27
R
B
11
Changed
Added
b
b
b
PCB4
24
F
27
R
10
11
B
26
U
15
E2
Q
U
S
23
Changed
22
Changed
Refer to Cassette Tray Section
18
PCB6
A
A
16
19
20
17
T
M
Changed
F
21
T
25
Changed

2.2. OPERATION PANEL SECTION

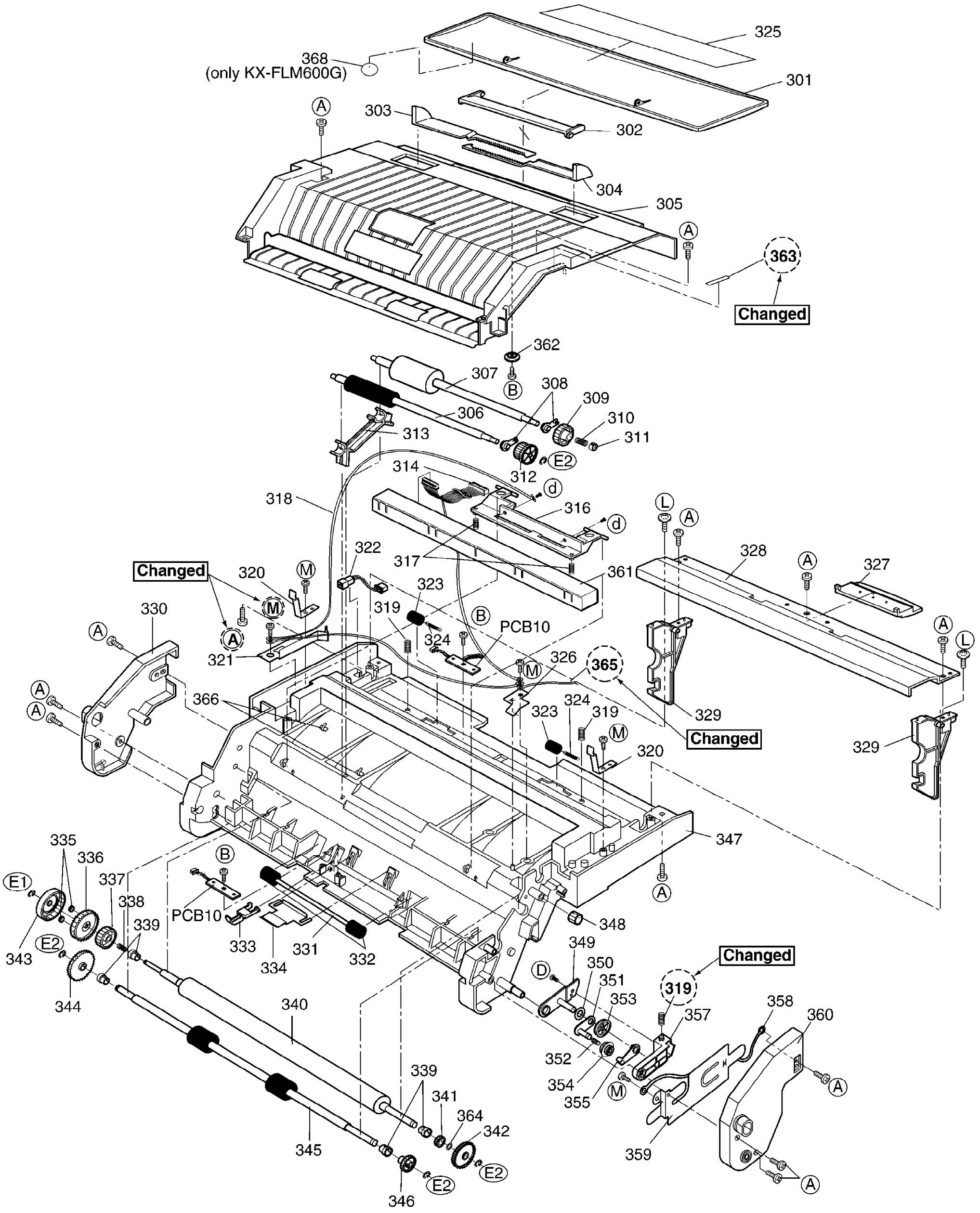

130
101
102
103
104
105
113
112
114
106
115
115
109
111
110
107
108
PCB12
PCB3
V
K
116
P
119
117
V
V
118
Changed
(BOTTOM VIEW)
132
133
Changed
131
A
120
A
PCB11
121
B
125
122
A
A
P
H
C
117
A
126
A
123
128
127
C
124
123
124
129

2.3. SUB FRAME SECTION 1

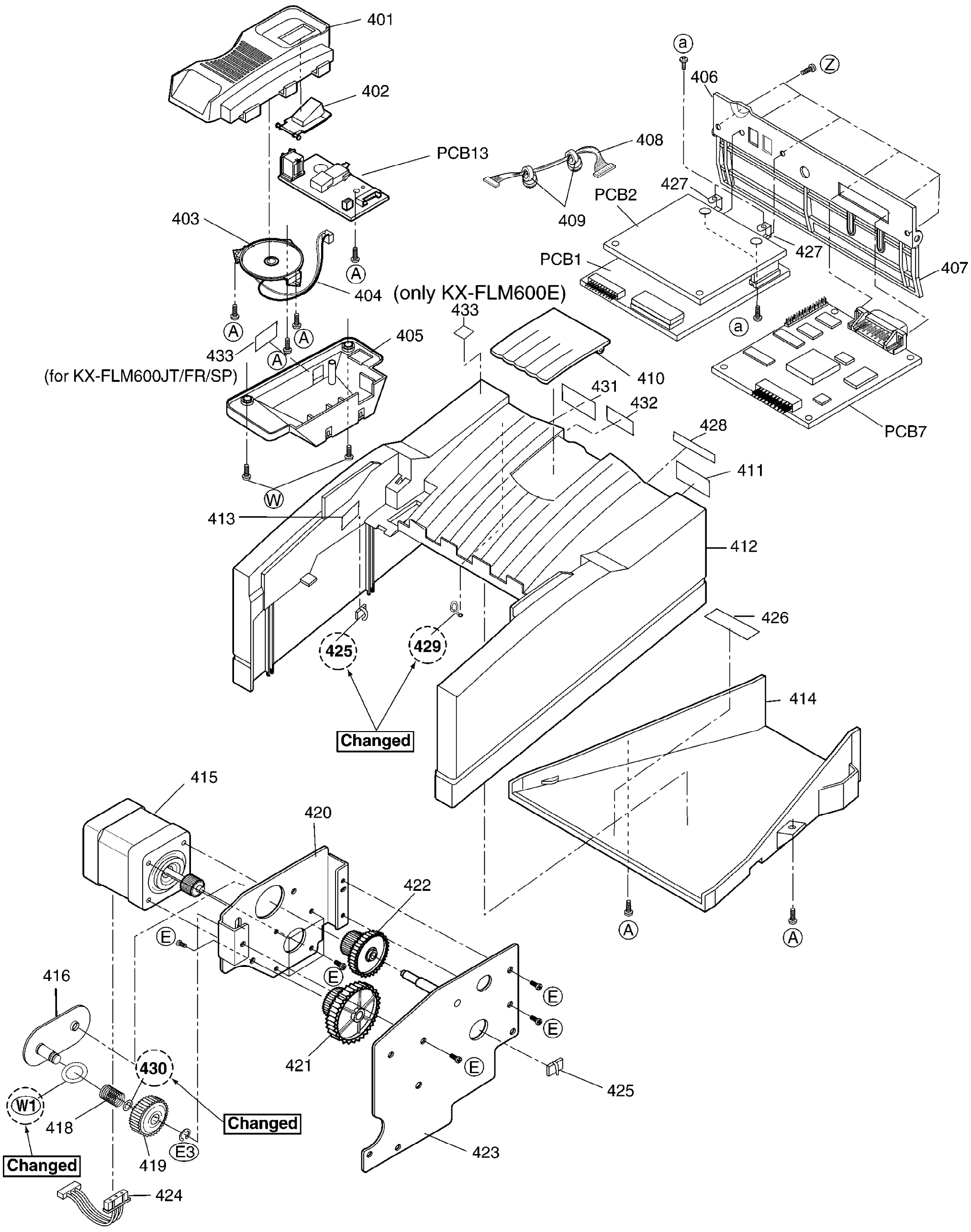

204
202
Ⓐ
201
Ⓑ
203
Ⓐ
202
Ⓑ
203
238
205
201
Ⓐ
Ⓐ
206
230
231
207
242
234
208
210
237
241
211
ⓔ
209
207
236
213
ⓔ
212
Ⓦ
231
230
232
217
Ⓜ
235
Ⓝ
219
214
ⓔ
ⓔ
215
220
Ⓝ
Ⓐ
221
243
216
240
239
228
224
Ⓐ
218
223
Ⓐ
222
225
229
226
228
227
225
223
226

(This page is no change.)

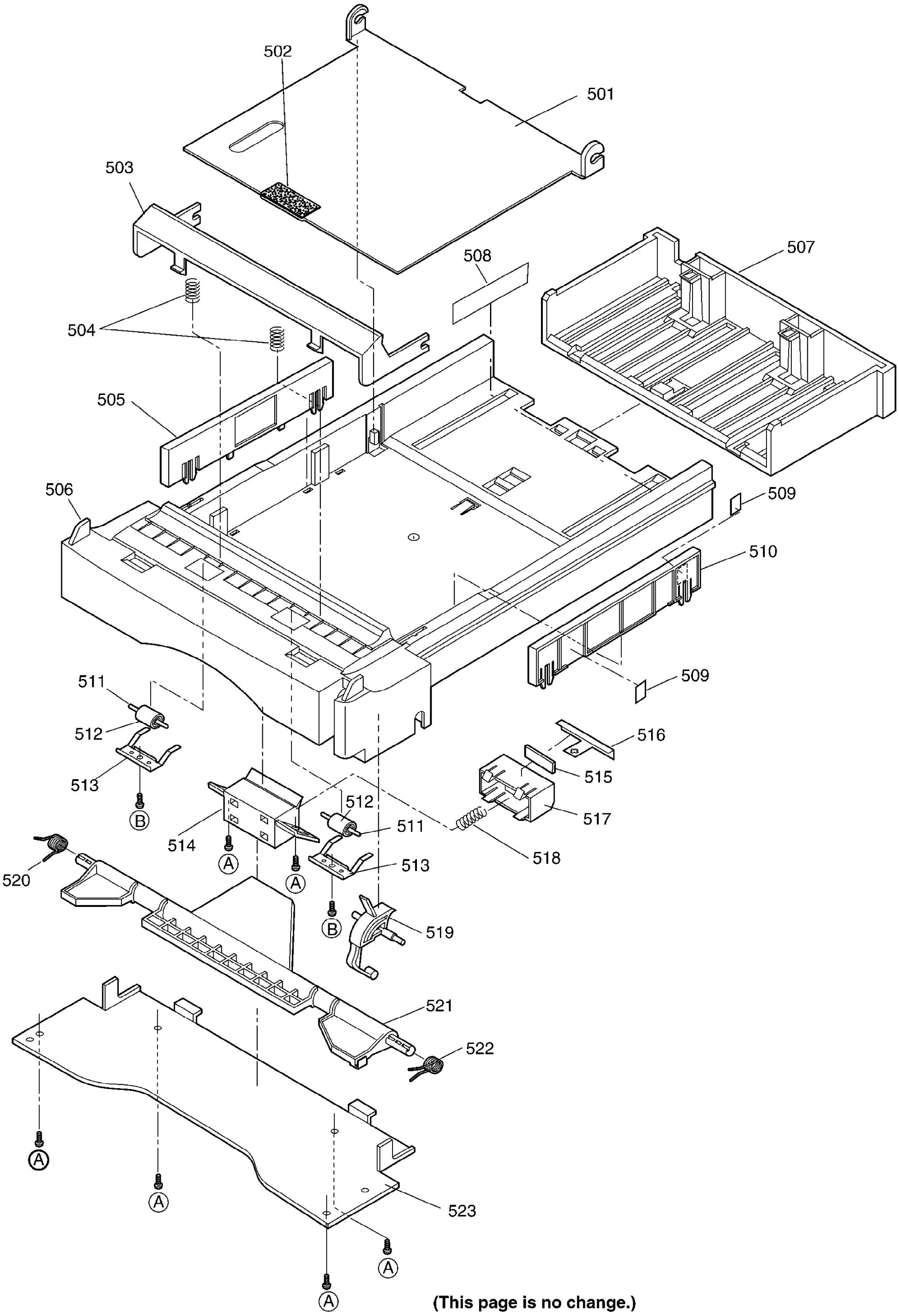
2.4. SUB FRAME SECTION 2


325
368
(only KX-FLM600G)
301
A
303
302
304
305
A
363
Changed
362
307
B
308
309
310
311
306
313
E2
312
314
d
318
316
d
L
A
317
361
328
A
327
322
Changed
320
M
323
330
A
M
319
B
PCB10
A
324
A
321
326
365
A
A
366
M
323
324
319
M
329
Changed
329
320
347
335
336
B
E1
337
338
PCB10
339
A
348
E2
333
331
332
349
Changed
343
334
D
350
351
319
344
340
353
358
357
360
352
354
M
A
355
339
341
364
342
345
359
E2
E2
A
346

2.5. FRAME COVER / MOTOR SECTION

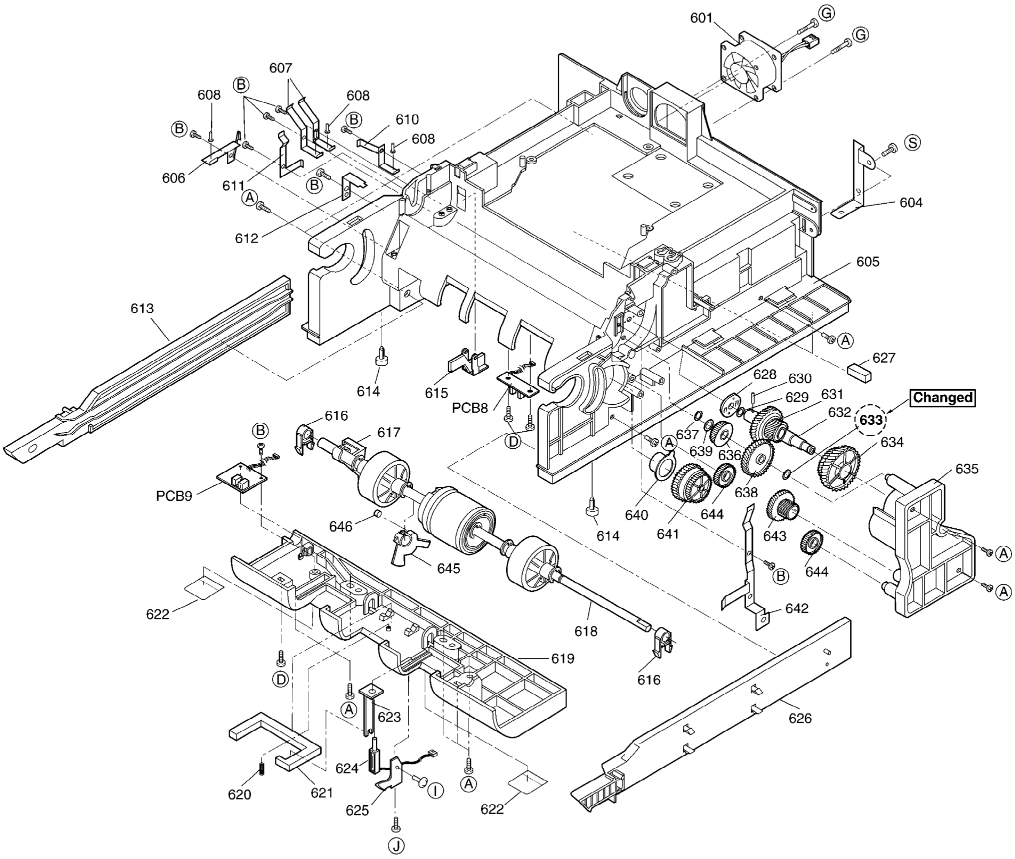

401
402
PCB13
403
404
(only KX-FLM600E)
A
433
(for KX-FLM600JT/FR/SP)
405
W
413
425
429
Changed
a
406
Z
408
409
PCB2
427
427
PCB1
407
433
410
431
432
PCB7
428
411
412
426
414
415
420
422
E
416
430
W1
418
419
E3
421
423
425
424
Changed

2.6. CASSETTE TRAY SECTION

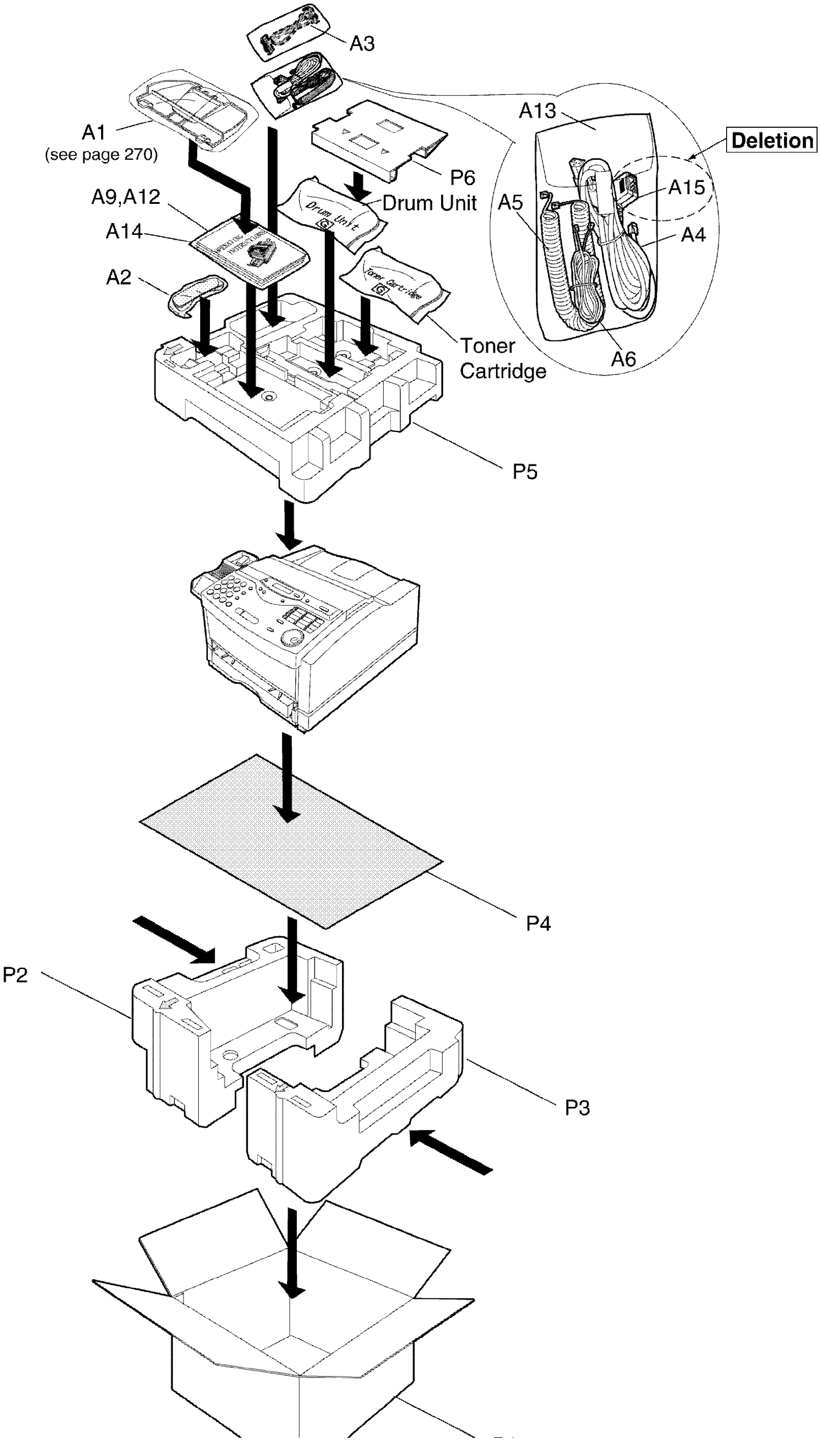

502
501
503
508
507
504
505
506
509
510
509
511
512
513
B
516
515
512
511
517
514
A
A
513
518
520
B
519
521
522
A
A
523
A
A

(This page is no change.)

2.7. MAIN FRAME SECTION


601
G
G
607
608
B
608
B
610
608
B
B
606
611
B
A
612
S
604
605
613
A
627
614
615
PCB8
D
628
630
629
631
632
633
Changed
634
616
617
B
PCB9
A
637
639
636
640
641
644
638
635
646
645
614
643
B
644
A
A
642
622
618
619
D
616
A
623
626
624
620
621
625
I
A
622
J

3. ACCESSORIES AND PACKING MATERIALS


A3
A1
(see page 270)
A13
Deletion
P6
A9,A12
Drum Unit
A5
A15
A14
A4
A2
Toner
Cartridge
A6
P5
P4
P2
P3

(only KX-FLM600PD)

I / KXFLM600AL/NZ/PD/ / JT/FR/SA/SP/TK / Printed in Japan

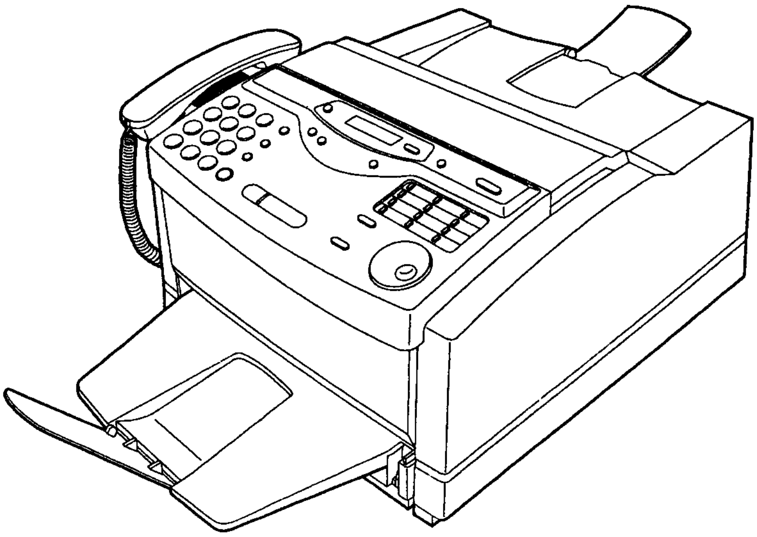
ORDER NO. KM79907295C2

Service Manual

Multi-Function Laser FAX

KX-FLM600G

(for Germany)



Panasonic

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When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

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SCHEMATIC DIAGRAM (PRINTER CONTROL) 255

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PRINTED CIRCUIT BOARD (H.V.P.S) 264

SCHEMATIC DIAGRAM (H.V.P.S) 265

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EXPLANATION OF CD-ROM SERVICE NUMBER 289

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Location of Controls 13, 14
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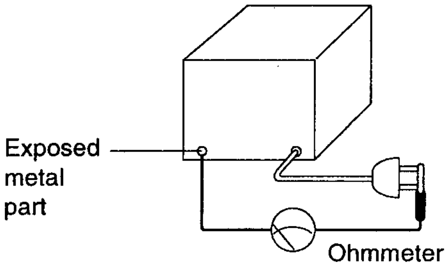
SAFETY PRECAUTIONS

1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screwheads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.
   The equipment should be repaired and rechecked before it is returned to the customer.



Resistance = more than 1MΩ
(at DC 500 V)

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1) Cover the plastic part's boxes with aluminum foil.
2) Ground the soldering irons.
3) Use a conductive mat on the worktable.
4) Do not touch the IC or LSI pins with bare fingers.

BATTERY CAUTION

CAUTION

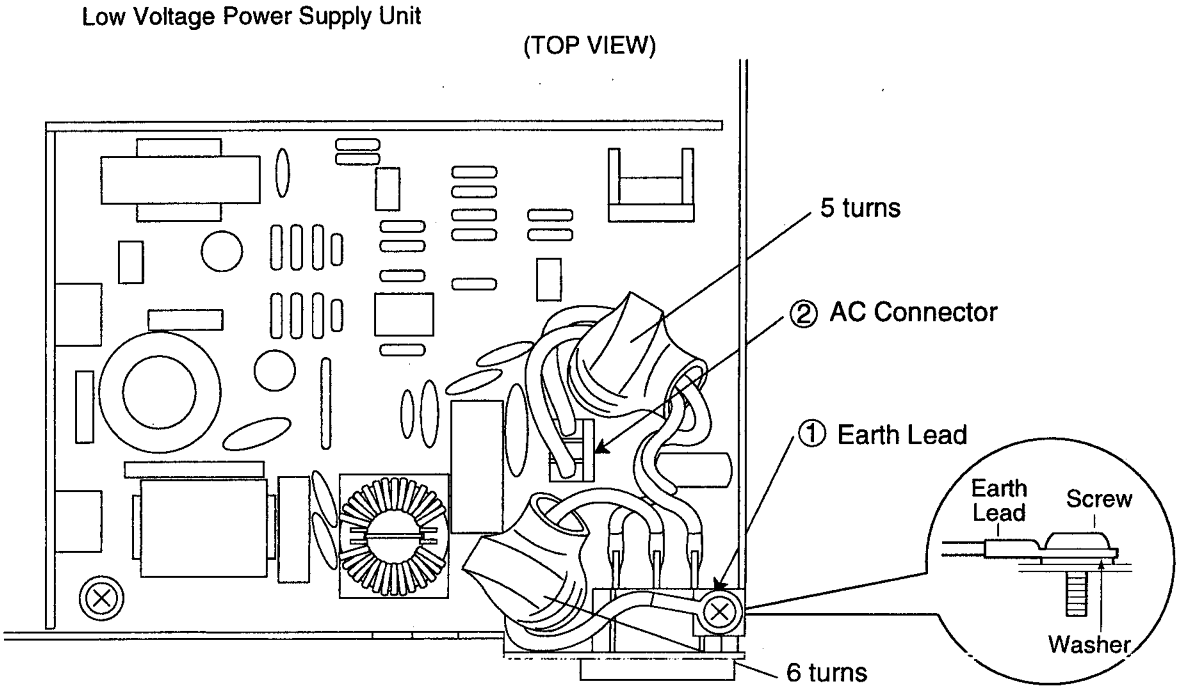
Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution:

Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

Recommend Type Number:	CR2032 (BATT)	Manufactured by MATSUSHITA
	CR2032 (BATT)	Manufactured by SONY

AC CAUTION

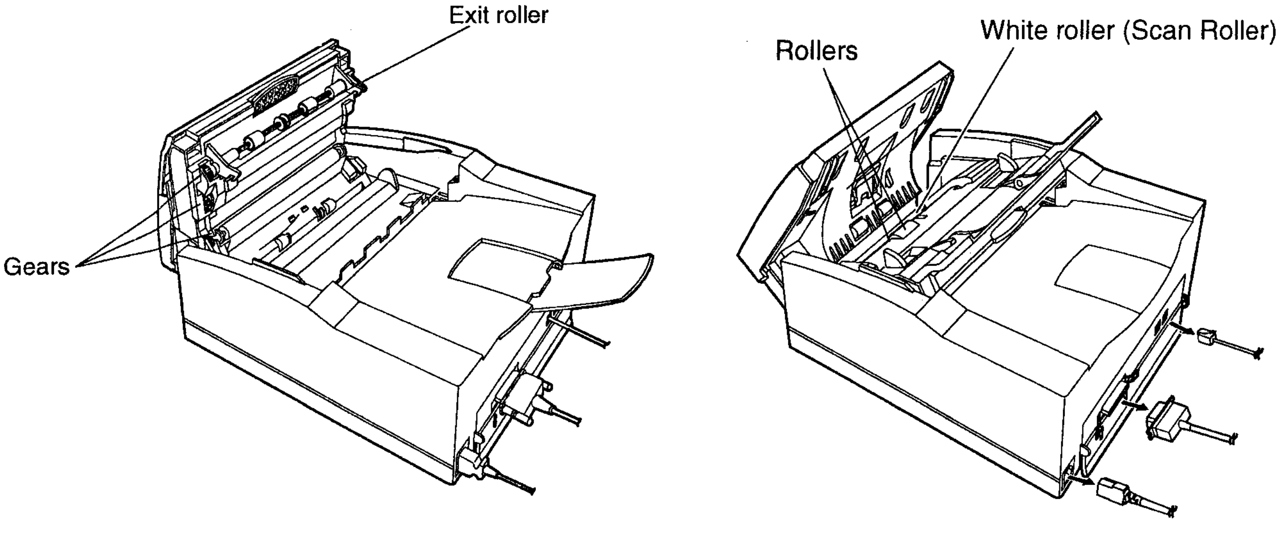
For safety, before closing the main cabinet , please make sure of the following precautions.
① The earth lead is fixed with the screw.
② The AC connector is connected properly.
③ Wind coils 5 turns or 6 turns respectively.


Low Voltage Power Supply Unit
(TOP VIEW)
5 turns
② AC Connector
① Earth Lead
Earth Lead
Screw
Washer
6 turns

PERSONAL SAFETY PRECAUTIONS

1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.
The moving sections of the unit are the rollers and gears. There is a separation roller and a document feed roller which are rotated by the motor. A gear rotates the related rollers. Be careful not to touch them with your hands, especially when the unit is operating.

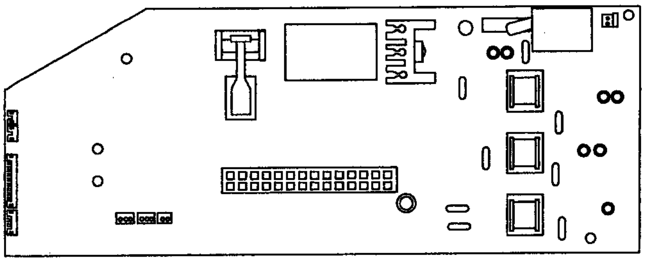

Exit roller
Gears
Rollers
White roller (Scan Roller)

2. LIVE ELECTRICAL SECTIONS

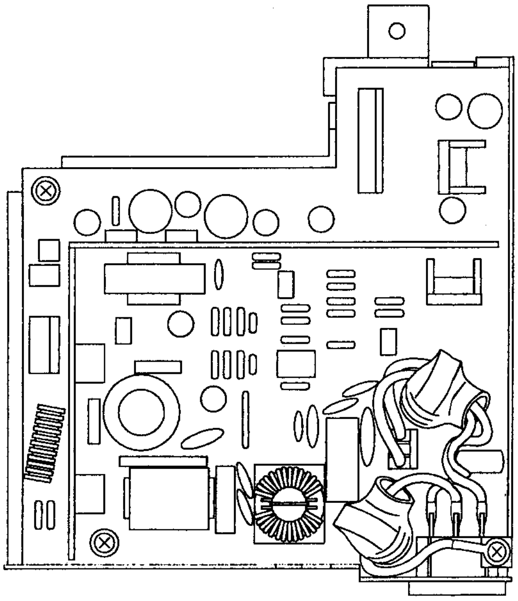
All the electrical sections of the unit supplied with AC power by the AC power cord are live.
Never disassemble the unit for service with the AC power supply plugged in.

AC voltage is supplied to the primary side of the power supply unit.
Therefore, always unplug the AC power cord before disassembling for service.

Be careful of "High Voltage" in these areas.



High Voltage Power Supply Board

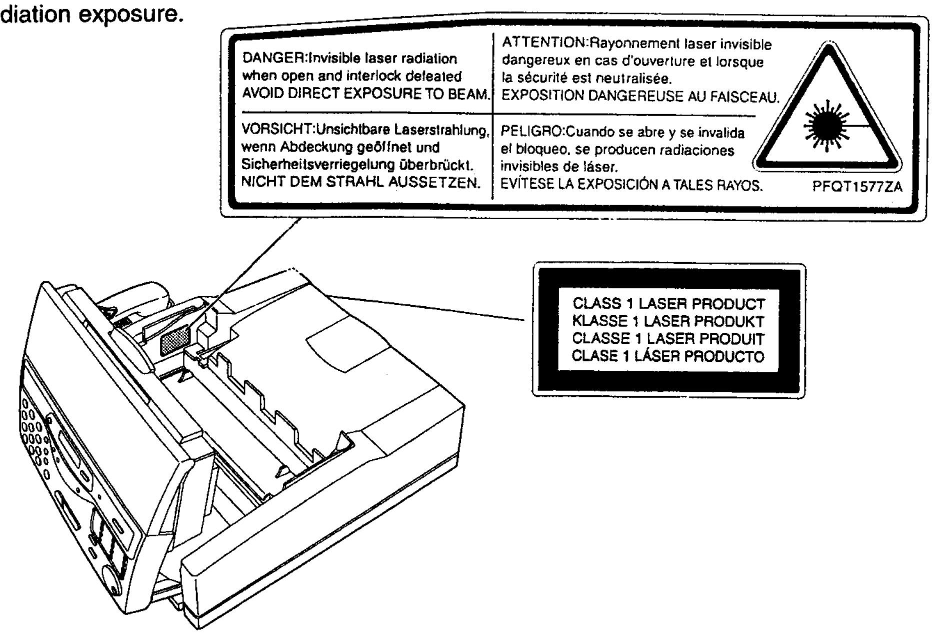


Low Voltage Power Supply Board

3. LASER BEAM SECTION

CAUTION:

- This unit utilizes a laser. Use of controls or adjustments or performance of procedures other than those specified here in may result in hazardous radiation exposure.



DANGER:Invisible laser radiation when open and interlock defeated AVOID DIRECT EXPOSURE TO BEAM.

ATTENTION:Rayonnement laser invisible dangereux en cas d'ouverture et lorsque la sécurité est neutralisée. EXPOSITION DANGEREUSE AU FAISCEAU.

VORSICHT:Unsichtbare Laserstrahlung, wenn Abdeckung geöffnet und Sicherheitsverriegelung überbrückt. NICHT DEM STRAHL AUSSETZEN.

PELIGRO:Cuando se abre y se invalida el bloqueo, se producen radiaciones invisibles de láser. EVÍTESE LA EXPOSICIÓN A TALES RAYOS.

PFQT1577ZA

CLASS 1 LASER PRODUCT
KLASSE 1 LASER PRODUKT
CLASSE 1 LASER PRODUIT
CLASE 1 LÁSER PRODUCTO

SERVICE PRECAUTIONS

PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.

FEATURES

General

- Help function
  Display: 1. Einstellungen
  2. Jog/Autowahl
  3. Fax Empfangen
  4. Kopierer
  5. Berichte
- LCD (Liquid Crystal Display) readout

Laser Printer function

- Fast 8ppm Printing
- 600x600 dpi Printer Resolution
- Windows 3.1/3.11/95/98/Ready GDI*** Printer Driver.

PC fax

- Send and Receive Faxes from your PC.
- Compatible with Windows 95/98 only

*** Graphics Device Interface

Plain Paper Facsimile Machine

- 9 second transmission speed *
- 15 second transmission speed **
- Letter/Legal, G3 compatible
- Resolution : 64 level
- Delayed transmission
- Overseas transmission function
- Remote FAX receiving using an extension phone
- Out of paper reception

* The 9 second speed is based upon the CCITT No. 1 Test Chart on the condition that memory transmission is performed.

** The 15 second speed is based upon the CCIT No. 1 Test Chart.

Memory Capacity

Approx. 120 pages of memory transmission/reception/copy (Based on the CCITT No. 1 Test Chart in standard resolution.)

Integrated Telephone System

- On-hook dialing
- Monitorphone
- One-Touch dial (11x2 Phone Numbers)
- 100-Station telephone directory with *Jog Dial*

Copier function

- Enlargement and reduction
- Collate
- 64-Level halftone

PC-Scanner

- 400dpi (interpolated) scanning capability
- Easy to use document Viewer
- Compatible with Windows 95/98
- Windows 3.1/3.11(Need application software which is compatible with TWAIN driver.)

Trademarks

IBM is a registered trademark of International Business Machines Corporation.
Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.
All other trademarks identified herein are the property of their respective owners.

SPECIFICATIONS

Applicable Lines: Public Switched Telephone Network
Document Size: Max. 216mm(8.5") in width
Max. 600mm(23 5/8") in length
Effective Scanning Width: 208mm(8 3/16")
Recording Paper Size: A4: 210mmx297mm
Effective Printing Size: 208mm(8 3/16")
Transmission Time*1: Approx. 8sec./page (ECM-MMR)*2
Scanning Density: Horizontal: 8pels/mm (203pels/inch)
Vertical: 3.85lines/mm (98lines/inch)-STANDARD mode
7.7lines/mm (196lines/inch)-FINE/HALF TONE mode
15.4lines/mm (392lines/inch)-SUPER FINE mode
Halftone Level: 64-level
Scanner Type: CIS(Contact Image Sensor)
Printer Type: Laser Beam Printing
Data Compression System: Modified Huffman (MH), Modified READ (MR), Modified Modified READ (MMR
Modem Speed: 14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback
Operation environment: 10-32.5·· (50-90.5F), 20-80 %RH(Relative Humidity)
Dimensions(H×W×D): 422x430x212mm (16 5/8x16 15/16x8 11/32")
Mass(Weight): Approx. 12.2kg (26.9 lb.)
Power Consumption: Standby: Approx. 40W
Power save*3: Approx. 10W
Transmission: Approx. 12W (Power save)
Approx. 42W (Standby)
Print(Copy or Reception): Approx. 200W
Maximum: Approx. 480W
Power Supply: 220V-240V AC, 50Hz
Memory Capacity: Fax memory: Approx. 120pages memory transmission and reception
(Based on CCITT No.1 Test Chart in standard resolution)

*1 Transmission speed depends upon the contents of the pages,resolution,telephone line conditions and capability of the receiving unit.
*2 The 8 second speed is based upon the CCITT No.1 Test Chart.
*3 If this product is not used for 5 minutes, it will change to power save mode.

Design and specifications are subject to change without notice.

OPTIONAL ACCESSORY

Parts No.	Description	Specifcations
KX-FA75X	Toner cartridge and drum unit	1 toner cartridge and 1 drum unit

PRINTER FEATURE

Printer Type: Laser beam printer
Printer Speed: 8 ppm
Compatible OS: Windows 3.1/3.11/95/98
Interface: 8-bit parallel (Included)
Paper specifications:
Media Size: Using the paper cassette

paper

Media	Size	Dimension
Paper	A4	210mmX297mm

Using the paper tray

Media	Size	Dimension
Paper	Letter	216 mm X 279 mm (8½" X 11")
	Legal	216 mm X 356 mm (8½" X 14")
	A4	210 mm X 297 mm
	Executive	184 mm X 267 mm (7¼" X 10½")
Transparency	Letter	216 mm X 279 mm (8½" X 11")
	A4	210 mm X 297 mm
*Envelope	COM10	105 mm X 241 mm (4⅛" X 9½")
	DL	110 mm X 220 mm

Paper Weight: Using the paper cassette
60 g/m^2 to 90 g/m^2 (16 lb. to 24 lb.)
Using the paper tray (manual feed)
60 g/m^2 to 105 g/m^2 (16 lb. to 28 lb.)

*• A thin, sharply creased leading edge
- Paper weight of 75 g/m^2 (20 lb.)
- Flat, free of curls, wrinkles, nicks, etc.
- No cotton and/or fiber material included

Note:
- Fax receiving and copying are only available when using the paper cassete.

SCANNER FEATURE

Document Size: Max. 216 mm (8½") in width
Max. 600 mm (23⅝") in length
Effective Scanning Width: 208 mm ($8\frac{3}{16}$")
Scanning Density:

Standard	100 X 200 DPI
Fine	200 X 200 DPI
S-Fine	200 X 400 DPI

Note:
- It can be changed by the soft setting.

Halftone Level: 64-level
Scanner Type: CIS (Contact Image Sensor)
Compatible OS: Windows 95/98
Windows 3.1/3.11 (Need application software which is compatible with TWAIN driver.)

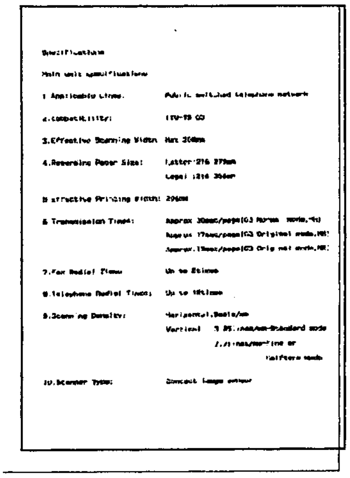
Note:
- Any details given in these instructions are subject to change without notice.
- The pictures and illustrations in these instructions may vary slightly from the actual product.

Toner life

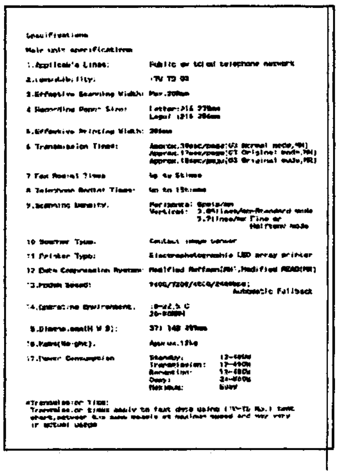
Toner life of the included toner cartridge or KX-FA75X toner cartridge depends on the amount of content in a received, copied or printed document. We refer to the content as “image area”. Because image area varies in actual usage, so does toner life. The following is the approximate relationship between image area and toner life for the included toner cartridge or KX-FA75X toner cartridge.

- **Toner life for the included toner cartridge or KX-FA75X toner cartridge:**

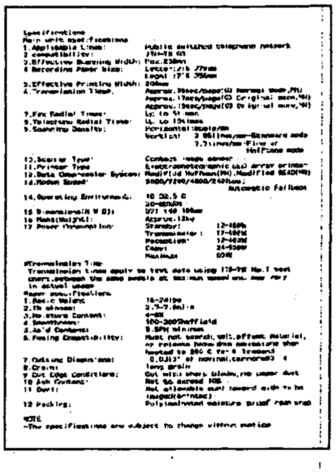
5% image area



10% image area

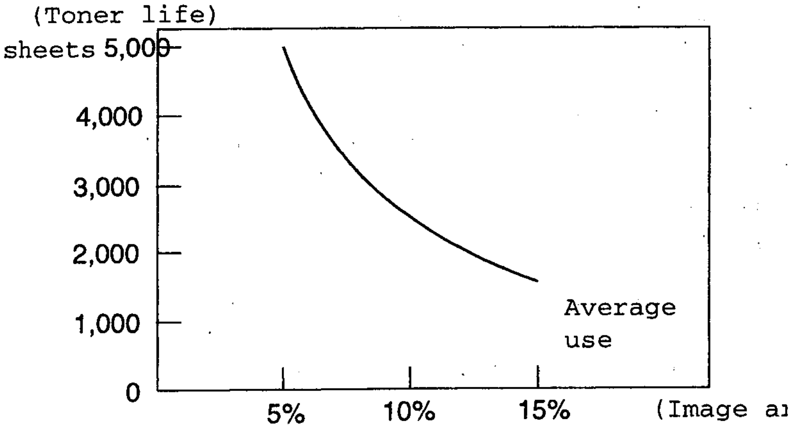


15% image area



Note:

- The image area changes with the depth, thickness and size of the characters in the document.



Note:

- Toner life will vary depending on actual usage.

Drum life

The included drum unit or KX-FA75X drum unit can print approx. 5,000 sheets of letter size paper regardless of the content of image area.

CCITT NO. 1 TEST CHART (Actual size)

THE SLEREXE COMPANY LIMITED
SAPORS LANE - BOOLE - DORSET - BH 25 8 ER
TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

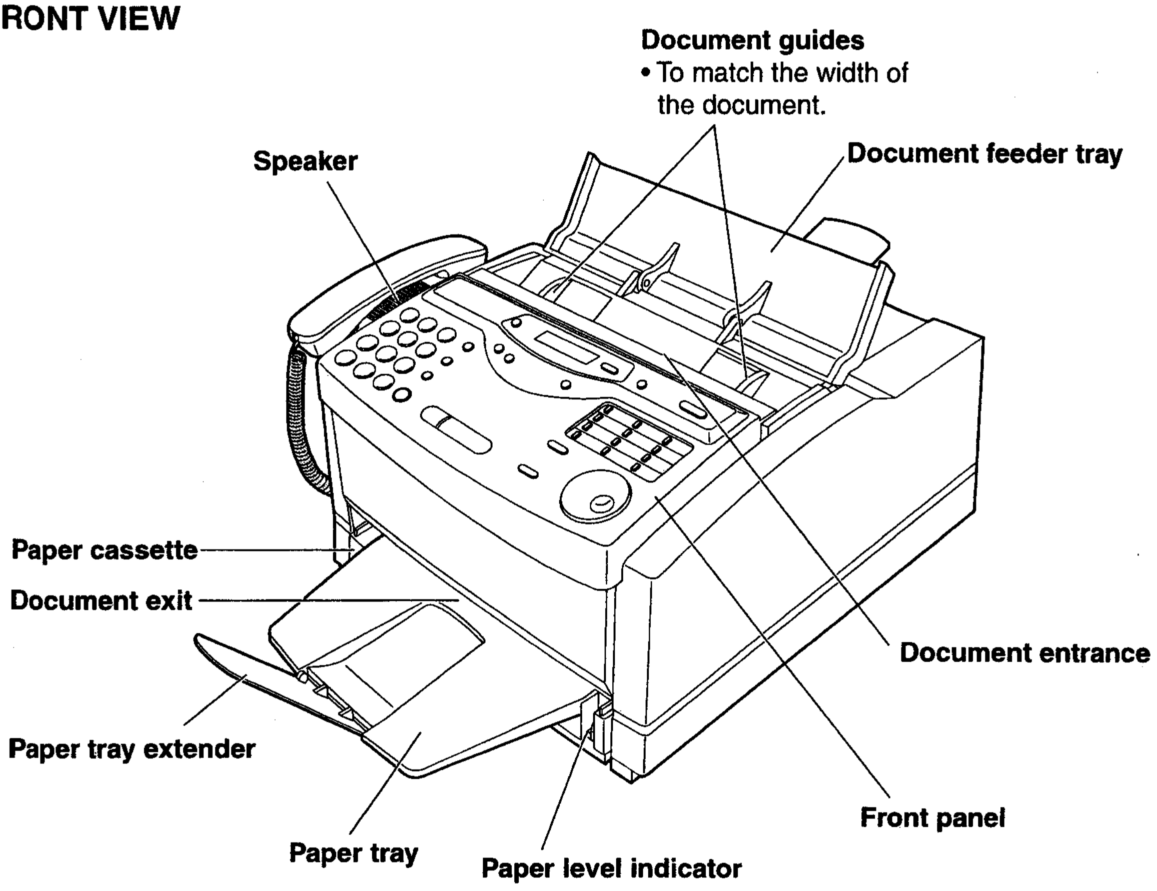
Yours sincerely,

Phil.

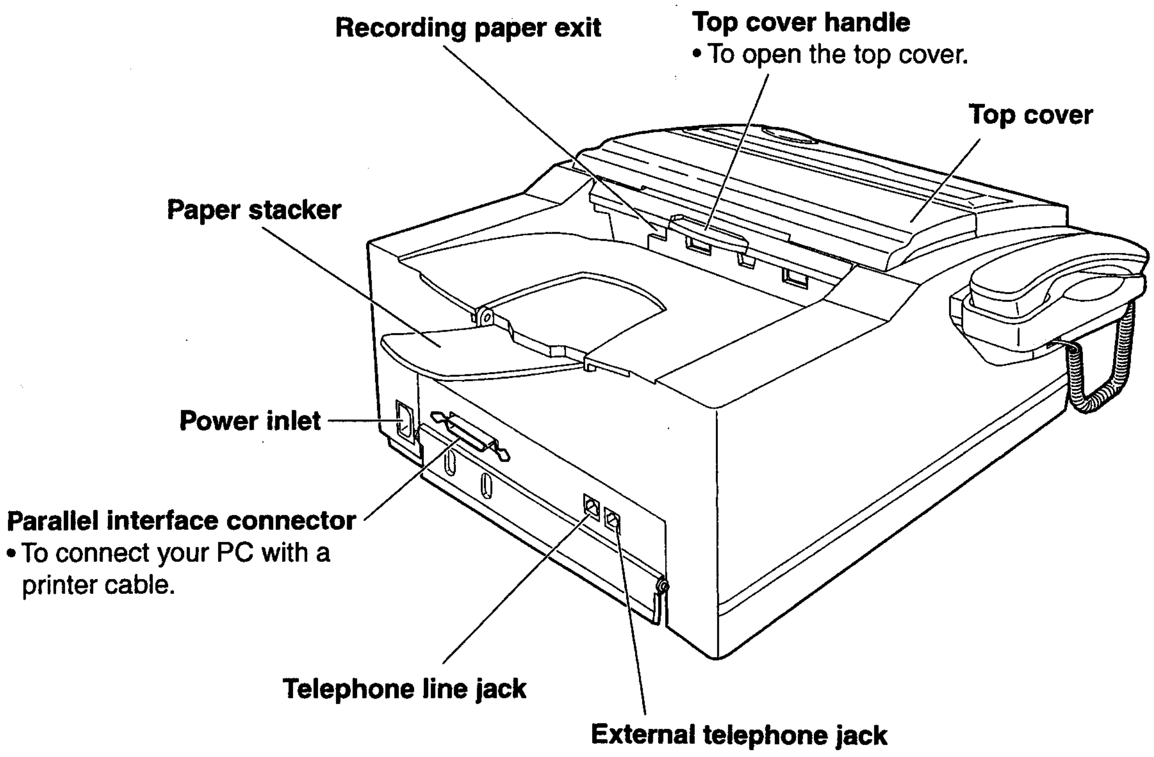
P.J. CROSS
Group Leader - Facsimile Research

LOCATION OF CONTROLS

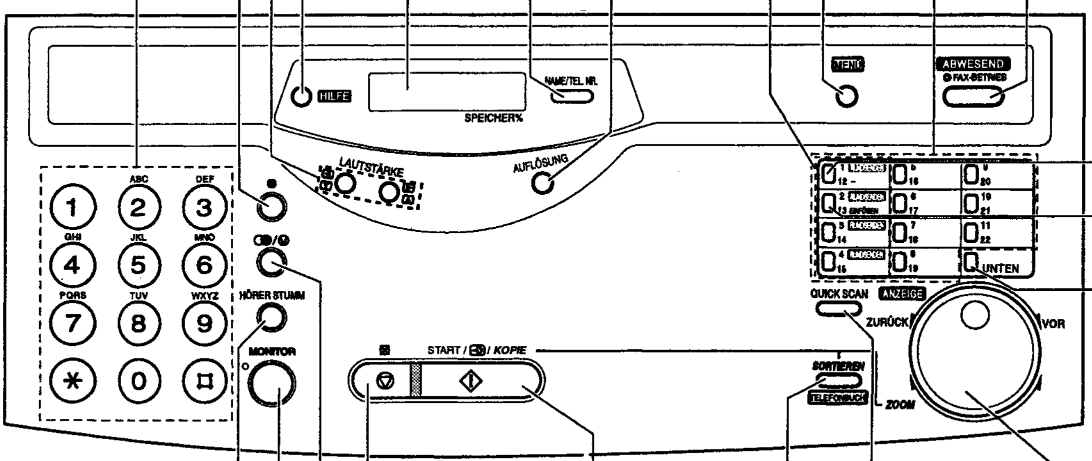
1. FRONT VIEW


Document guides
• To match the width of the document.
Speaker
Document feeder tray
Paper cassette
Document exit
Document entrance
Paper tray extender
Front panel
Paper tray
Paper level indicator

2. REAR VIEW


Recording paper exit
Top cover handle
• To open the top cover.
Top cover
Paper stacker
Power inlet
Parallel interface connector
• To connect your PC with a printer cable.
Telephone line jack
External telephone jack

3. CONTROL PANEL


HILFE
SPEICHER%
NAME/TEL NR.
LAUTSTÄRKE
AUFLÖSUNG
MENÜ
ABWESEND
FAX-BETRIEB
ABC
DEF
GHI
JKL
MNO
PQRS
TUV
WXYZ
HÖRER STUMM
MONITOR
START / KOPIE
QUICK SCAN
ANZEIGE
ZURÜCK
VOR
SORTIEREN
TELEFONBUCH
ZOOM
UNTEN

- To adjust volumes.
- To select feature settings during programming.
- To select a resolution.
- To confirm a stored telephone number
- Hookswitch
- To print a quick reference.

Dial keypad

Display panel

- For transmission to multiple stations.
- For the One-Touch Dial.
- Command keys
- To initiate or exit programming.
- To turn the AUTO ANSWER mode on/off.
- To insert a hyphen.
- To insert one character or one space.
- To select stations 12–22 for the One-Touch Dial.
- For handset voice muting.
- To dial without lifting the handset.
- To stop an operation or cancel programming.
- To redial the last number dialed.
- To insert a pause during dialing.
- To initiate fax transmission, reception or copying.
- To store a setting during programming.
- To prepare the unit for manual feeding.
- To scan and store a document into memory, and then transmit or copy the stored document.
- To choose "Collated" or "Uncollated" in the copy mode.
- To store or edit names and telephone numbers.
- To search for a stored name.
- To select characters during programming.
- To select the basic features during programming.
- To select an enlargement/reduction rate in the copy mode.

CONNECTIONS

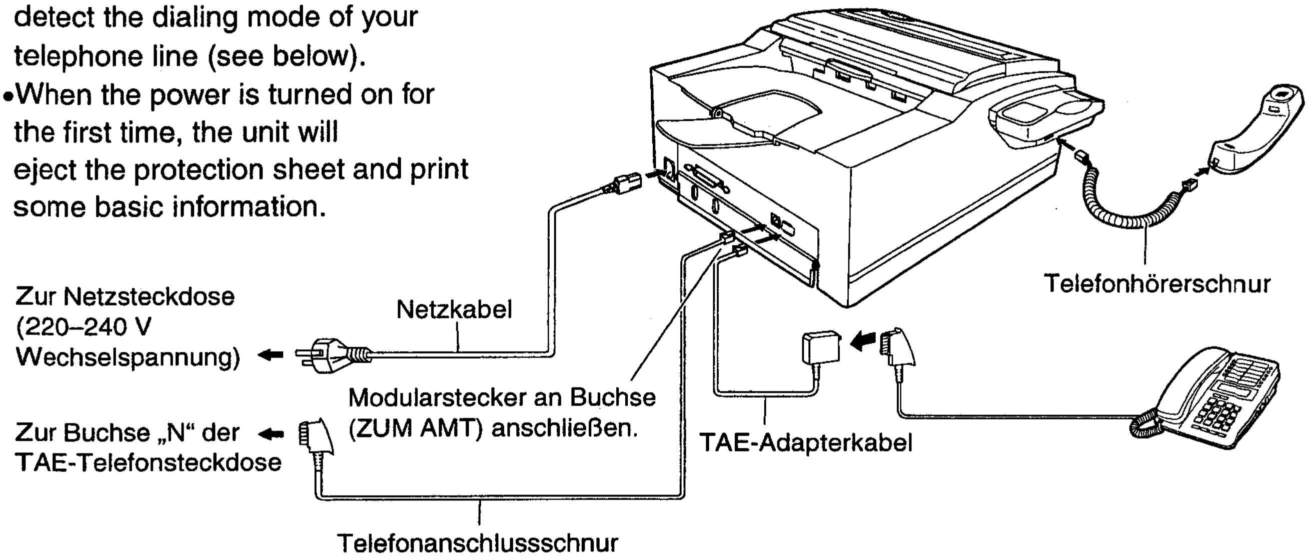
1.CONNECTION

1.Connect the handset cord.

2.Connect the telephone line cord.

3.Connect the power cord.

- The unit will automatically start to detect the dialing mode of your telephone line (see below).
- When the power is turned on for the first time, the unit will eject the protection sheet and print some basic information.


Zur Netzsteckdose (220–240 V Wechselspannung)
Netzkabel
Telefonhörerschnur
Modularstecker an Buchse (ZUM AMT) anschließen.
Zur Buchse „N“ der TAE-Telefonsteckdose
TAE-Adapterkabel
Telefonanschlussschnur

Note:

- For additional equipment protection, we recommend the use of a surge protector. The following types are available; TELESPIKE BLOK MODEL TSB (TRIPPE MFG. CO.), SPIKE BLOK MODEL SK6-0 (TRIPPE MFG. CO.), SUPER MAX (PANAMAX) or MP1 (ITW LINX).
  The warranty does not cover damage due to power line surges or lightning.
- When you operate this product, the power outlet should be near the product and easily accessible.

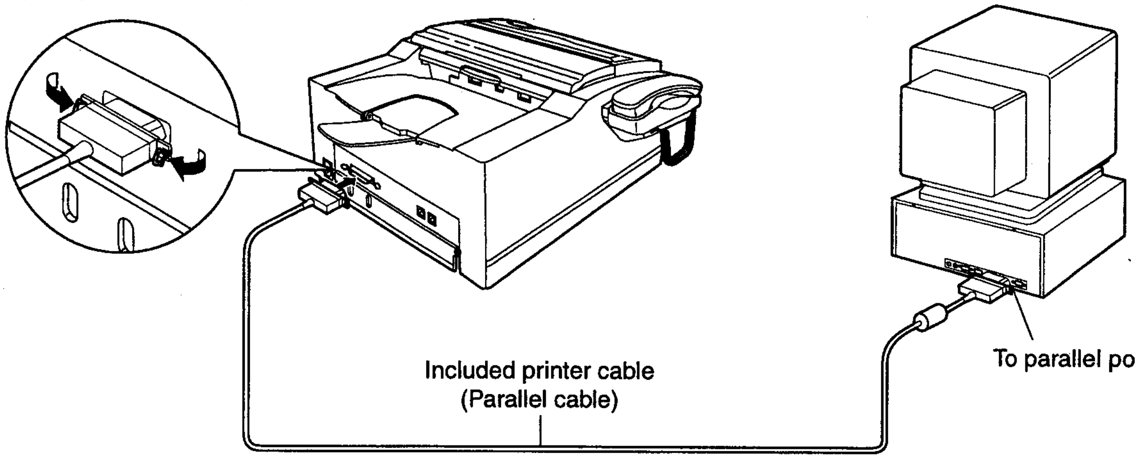
2. CONNECTING TO A COMPUTER

To run the Panasonic Multi-Function software (PANA LINK), you need the following software and hardware.

CPU:	An IBM compatible personal computer with a 486 or higher processor (Pentium is recommended.)
Basic Software:	Microsoft Windows 95 or Windows 98 (Windows 3.1/3.11*–printer driver only)
Memory Minimum:	16 MB (32 MB or more is recommended)
Hard disk:	More than 40 MB available space
Other:	Parallel port Panasonic Multi-Function fax machine

*Microsoft Windows operating system Version 3.1/3.11 (hereafter Windows 3.1/3.11)

Connect your personal computer to the fax machine as follows:



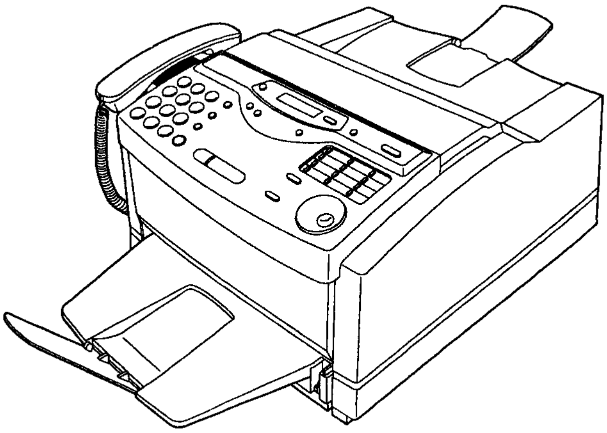
Caution:

- When connecting the fax machine to your computer, use the included printer cable for reliable data communications and compliance with FCC rules.
- Do not connect the printer cable to the serial port on the computer. This may cause damage to your fax machine and computer.

INSTALLATION

1. INSTALLATION SPACE

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently.



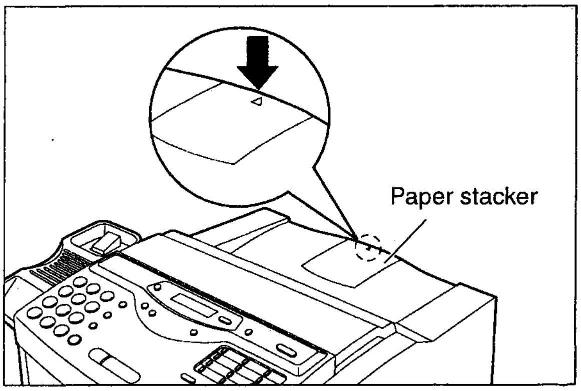
HxWxD: 422 mm x 430 mm x 212 mm
(without the manual feeding tray)
422 mm x 550 mm x 212 mm
(when the manual feeding tray is attached)
422 mm x 683 mm x 212 mm
(when the document tray, extra manual feeding tray or extra recording paper tray is opened)

NOTE

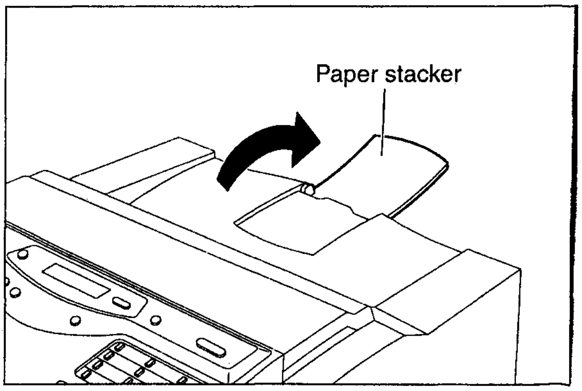
Avoid excessive heat or humidity.
Use the unit within the following ranges of temperature and humidity.
Ambient temperature: 5°C to 35°C
Relative humidity: 20% to 80% (without condensation)
Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.
Avoid direct sunlight.
Do not install near devices which contain magnets or generate magnetic fields.
Do not subject the unit to strong physical shock or vibration.
Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.
To protect the unit from damage, hold both sides when you move it.

2. INSTALLING THE PAPER STACKER

(1) Press "▽" marked area on the paper stacker.

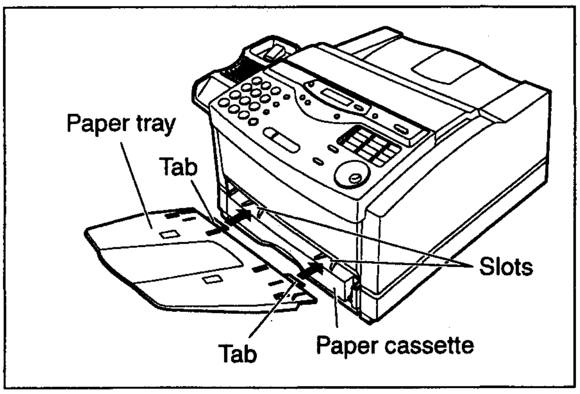


(2) Open the paper stacker.

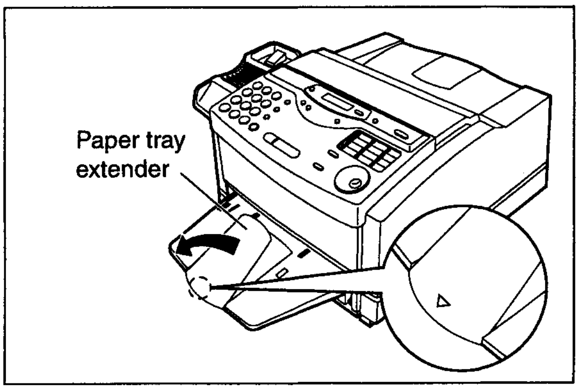


3. INSTALLING THE PAPER TRAY

(1) Insert the two tabs of the paper tray into the slots on the paper cassette.


Paper tray
Tab
Slots
Tab
Paper cassette

(2) Open the paper tray extender by pressing " ▽" marked area.

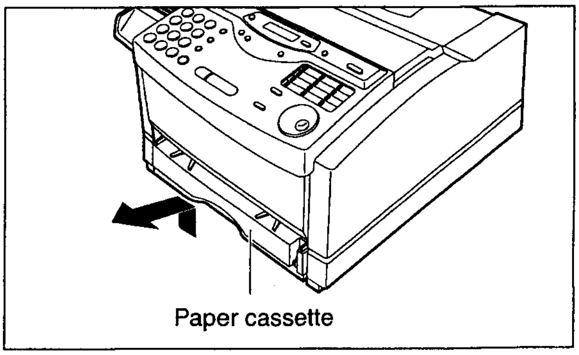

Paper tray extender

4. INSTALLING THE RECORDING PAPER

You can load letter or legal size paper in the paper cassette. The paper cassette can hold up to 250 sheets of 75 g/m² (20 lb.) paper. You can use 60 g/m² to 90 g/m² (16 lb. to 24 lb.) paper.

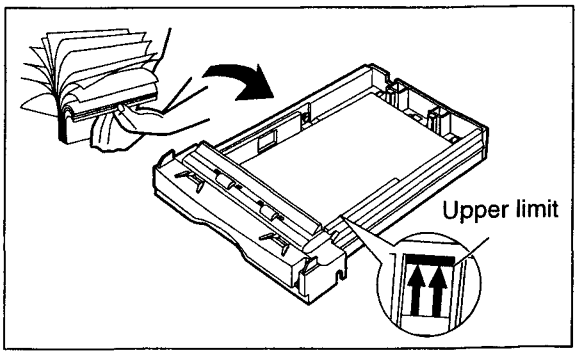
● Loading paper in the paper cassette

(1) Lift the paper cassette up slightly and pull it out of the unit.

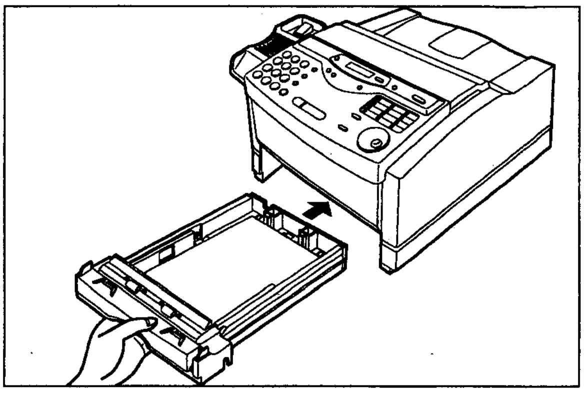

Paper cassette

(2) Fan the stack of paper to prevent a paper jam and place the paper into the paper cassette.

- Put the side to be printed face up.
- The height of the stack of paper should not exceed the upper limit on the paper cassette, or the paper may jam or multi-feed.


Upper limit

(3) Insert the paper cassette into the unit until it clicks into place.

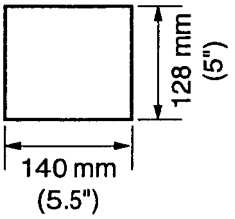


Note:

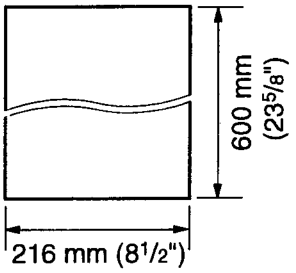
- **Do not use different types or thicknesses of paper in the paper cassette at the same time. This may cause a paper jam.**
- Avoid double-sided printing.
- Do not use paper printed from this unit for double-sided printing with other copiers or printers, or a paper jam may occur.

• Documents the unit can send

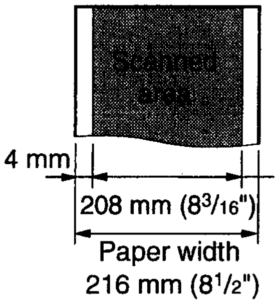
Minimum size



Maximum size



Effective scanning area



Document weight

Single sheet:
45 g/m^2 to 90 g/m^2
(12 lb. to 24 lb.)

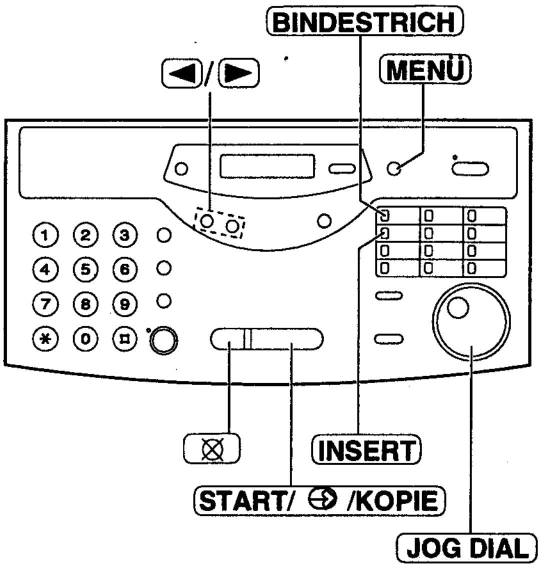
Multiple sheets:
60 g/m^2 to 75 g/m^2
(16 lb. to 20 lb.)
(length 128mm~)

Note:

- Remove clips, staples or other similar fastening objects.
- Check that ink, paste or correction fluid has dried.
- Do not send the following types of document. Use copies for fax transmission.
  - –Chemically treated paper such as carbon or carbonless duplicating paper
  - –Electrostatically-charged paper
  - –Heavily curled, creased or torn paper
  - –Paper with a coated surface
  - –Paper with a faint image
  - –Paper with printing on the opposite side that can be seen through the front (e.g. newspaper)

5. SETTING YOUR LOGO

The logo can be your company, division or name.



(1) Press (MENÜ).

Display: `Vorbereitung`

(2) Press (#), then (0) (2).

`Eigenes Logo`

(3) Press (START/ ⊕/KOPIE).

`LOGO=`

(4) Enter your logo, up to 30 characters, by using the dial keypad. See next page for details.

Example: Bill

1. Press (2) twice.

`LOGO=B` — Cursor

2. Press (4) six times.

`LOGO=Bi`

3. Press (5) six times.

`LOGO=Bil`

4. Press (►) to move the cursor to the next space and press (5) six times.

`LOGO=Bill`

(5) Press (START/ ⊕/KOPIE).

`Parameter [     ]`

(6) Press (MENÜ).

Note:

- You can enter your logo by rotating (JOG DIAL) (see next page).

To correct a mistake

- Use (◄) or (►) to move the cursor to the incorrect character, then make the correction.

To delete a character

- Move the cursor to the character you want to delete and press (⊠)

To insert a character

1. Use (◄) or (►) to move the cursor to the right of where you want to insert the character.
2. Press (EINSCHALTEN) (One-Touch Dial key 2) to insert a space and enter the character.

• To select characters with the dial keypad

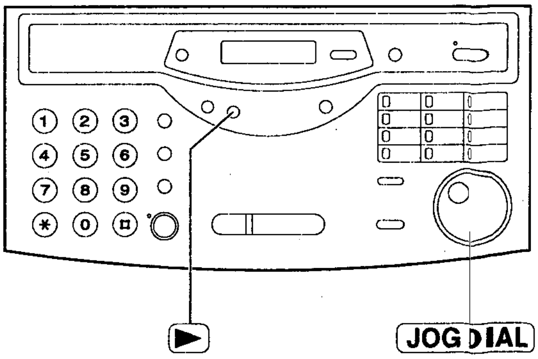
Pressing the dial keys will select a character as shown below.

Keys	Characters
①	1 [ ] { } + – / = , . _ ` : ; ? |
②	A Ä B C a ä b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O Ö m n o ö 6
⑦	P Q R S p q r s 7
⑧	T U Ü V t u ü v 8
⑨	W X Y Z w x y z 9
⓪	0 ( ) < > ! " # $ % & ¥ * @ ^ ' →
$\boxed{0^1}$	**HYPHEN** key (To insert a hyphen.)
$\boxed{0^2}$	**INSERT** key (To insert one character or one space.)
⊗	**Delete** key (To delete a character.)
○	◄ key (To move the cursor to the left.)
○	► key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.

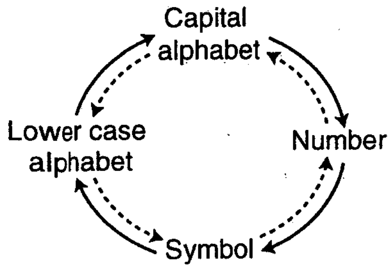
• To select characters using the JOG DIAL

Instead of pressing the dial keys, you can select characters using the JOG DIAL.

1. Rotate **JOG DIAL** until the desired character is displayed.
2. Press ► to move the cursor to the next space.
   - The character displayed in step 1 is inserted.
3. Return to step 1 to enter the next character.



Displayed order of characters



→ : Rotating to the right

---→ : Rotating to the left

6. REPLACING THE TONER CARTRIDGE AND DRUM UNIT

When the display shows the following message, replace the toner cartridge and drum unit with new ones.

Display: `TONER EMPTY` OR `TONER LOW`
<Toner alle> <Toner schwach>

Depending on usage, the following message may be displayed.

`DRUM LIFE OVER` OR `CHANGE DRUM`
<Trommel Ende> <Trommel wechsel>

The following is available for replacement.
KX-FA75X: Toner cartridge and drum unit

*Word in brackets < >are German.

Caution:

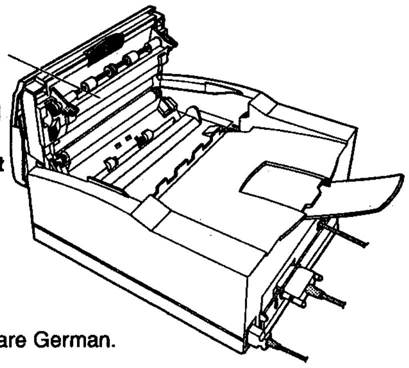
- If ingestion of toner occurs, drink several glasses of water to dilute stomach contents, and seek immediate medical treatment. If toner comes into contact with eyes, flush thoroughly with water, and seek medical treatment. If toner comes into contact with skin, wash thoroughly with soap and water.
- Do not put up the toner cartridge.
- The drum unit contains a photosensitive drum. Exposing it to light may damage the drum.
  - –Do not expose the drum unit to light for more than 5 minutes.
  - –Do not touch or scratch the green drum surface.
  - –Do not place the drum unit near dust or dirt.
  - –Do not place the drum unit in a high humidity area.
  - –Do not expose the drum unit to direct sunlight.

Important:

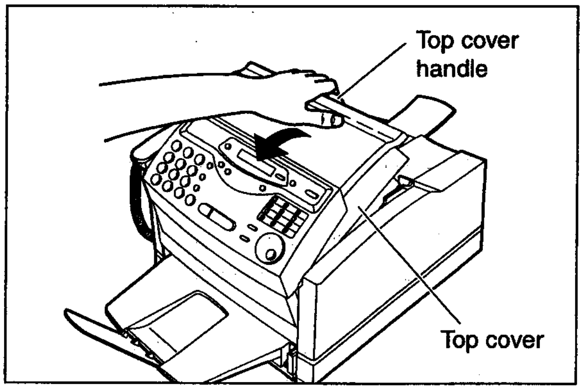
- To prevent loss of fax memory, when replacing the toner cartridge and drum unit, do not unplug the fax machine.
- Keep the protection materials in case the unit must be repacked and transported.

(1) Pull the top cover handle forward and open the top cover.

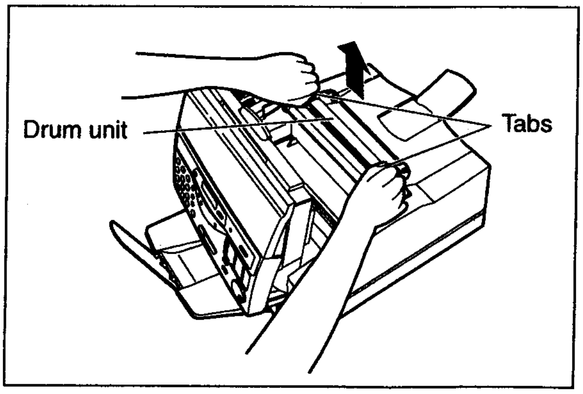
Caution:
The fuser unit gets hot.Do not touch it.
<Warnung:
Die Fixiereinheit wird sehr heiß.
Berührung unbedingt vermeiden.>



*Word in brackets < >are German.



(2) Remove the used drum unit by holding the two tabs.

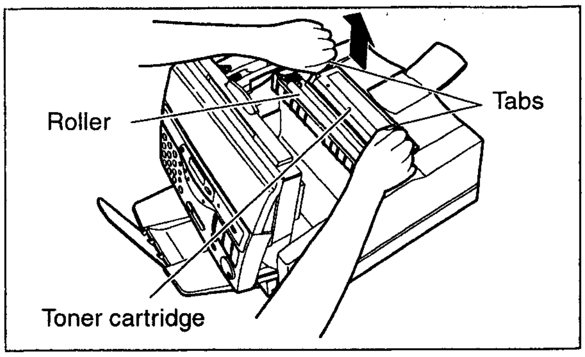


(continued)

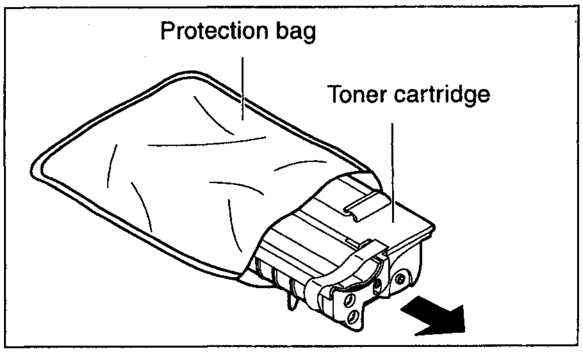
(3) Remove the used toner cartridge by holding the two tabs.

Caution:

- To avoid getting your hands dirty, do not touch the roller.


Roller
Tabs
Toner cartridge

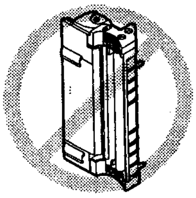
(4) Open the protection bag by cutting the end of the bag and remove the new toner cartridge.

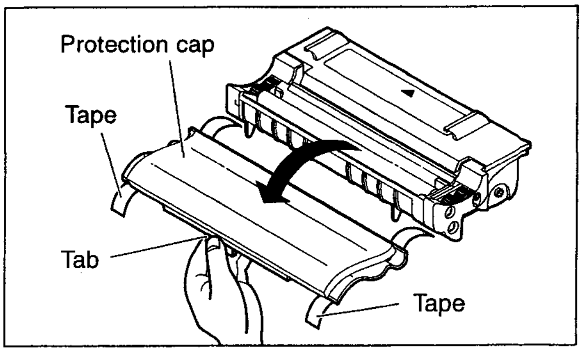

Protection bag
Toner cartridge

(5) Remove the tape and remove the protection cap by holding the tab.

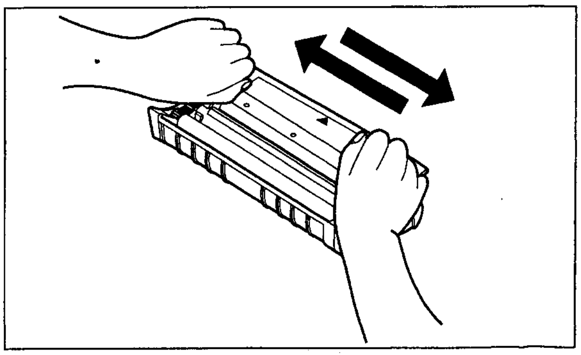
Caution:

- Do not put up the toner cartridge.

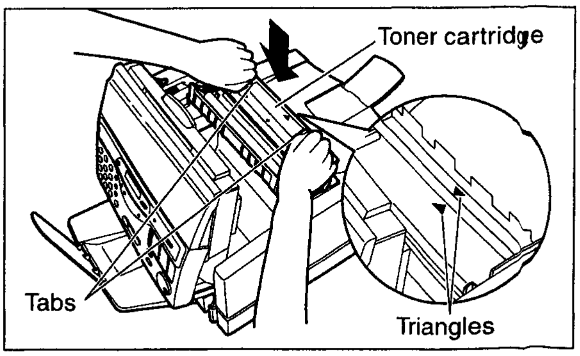



Protection cap
Tape
Tab
Tape

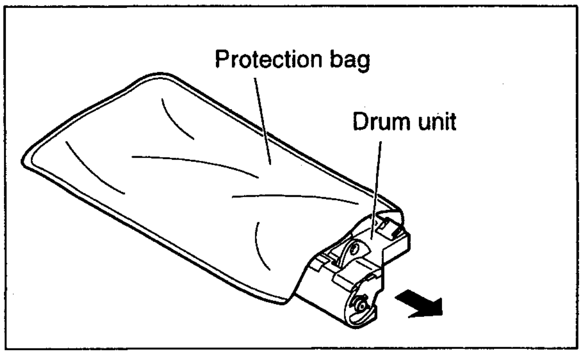
(6) Rock the toner cartridge from side to side several times carefully.



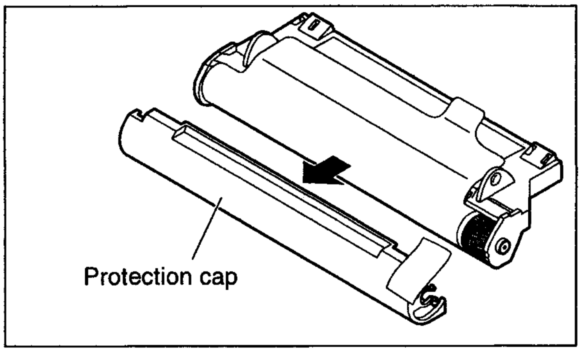
(7) Install the new toner cartridge by holding the two tabs and matching the triangles.


Toner cartridge
Tabs
Triangles

(8) Open the protection bag by cutting the end of the bag and remove the drum unit.


Protection bag
Drum unit

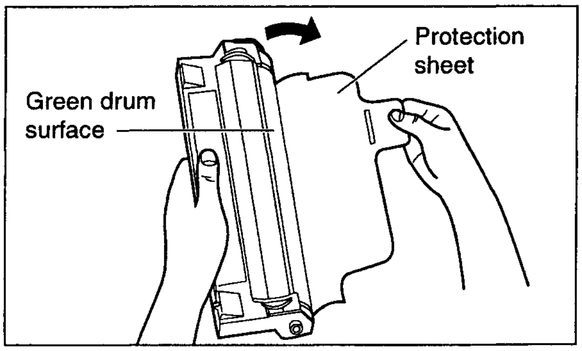
(9) Remove the protection cap.


Protection cap

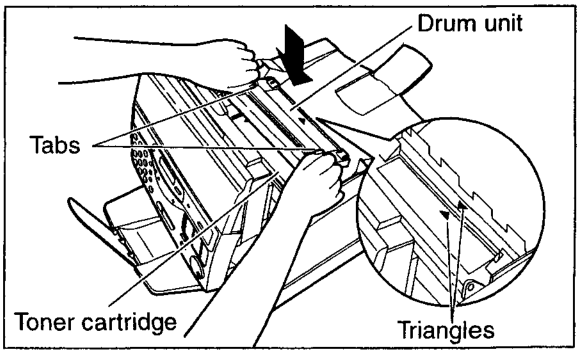
(10) Remove the protection sheet.

Caution:

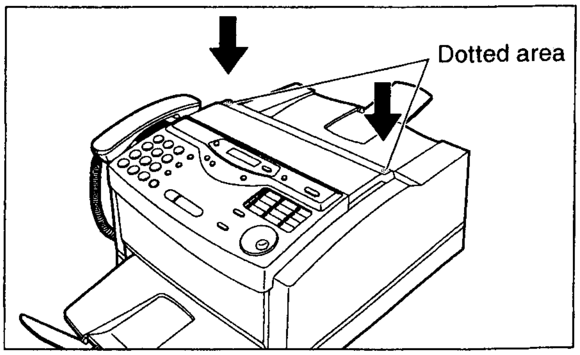
- Do not touch or scratch the green drum surface as this may damage the drum unit.
- Do not expose the drum unit to light for more than 5 minutes as this may damage the drum unit.


Protection sheet
Green drum surface

(11) Install the new drum unit on the toner cartridge by holding the two tabs and matching the triangles.


Drum unit
Tabs
Toner cartridge
Triangles

(12) Close the top cover securely by pushing down on the dotted area at both ends.


Dotted area

MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1) Periodic maintenance
Inspect the equipment periodically and if necessary, clean any contaminated parts.

2) Check for breakdowns
Look for problems and consider how they arose.
If the equipment can be still used, perform copying, self testing or communication testing.

3) Check equipment
Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

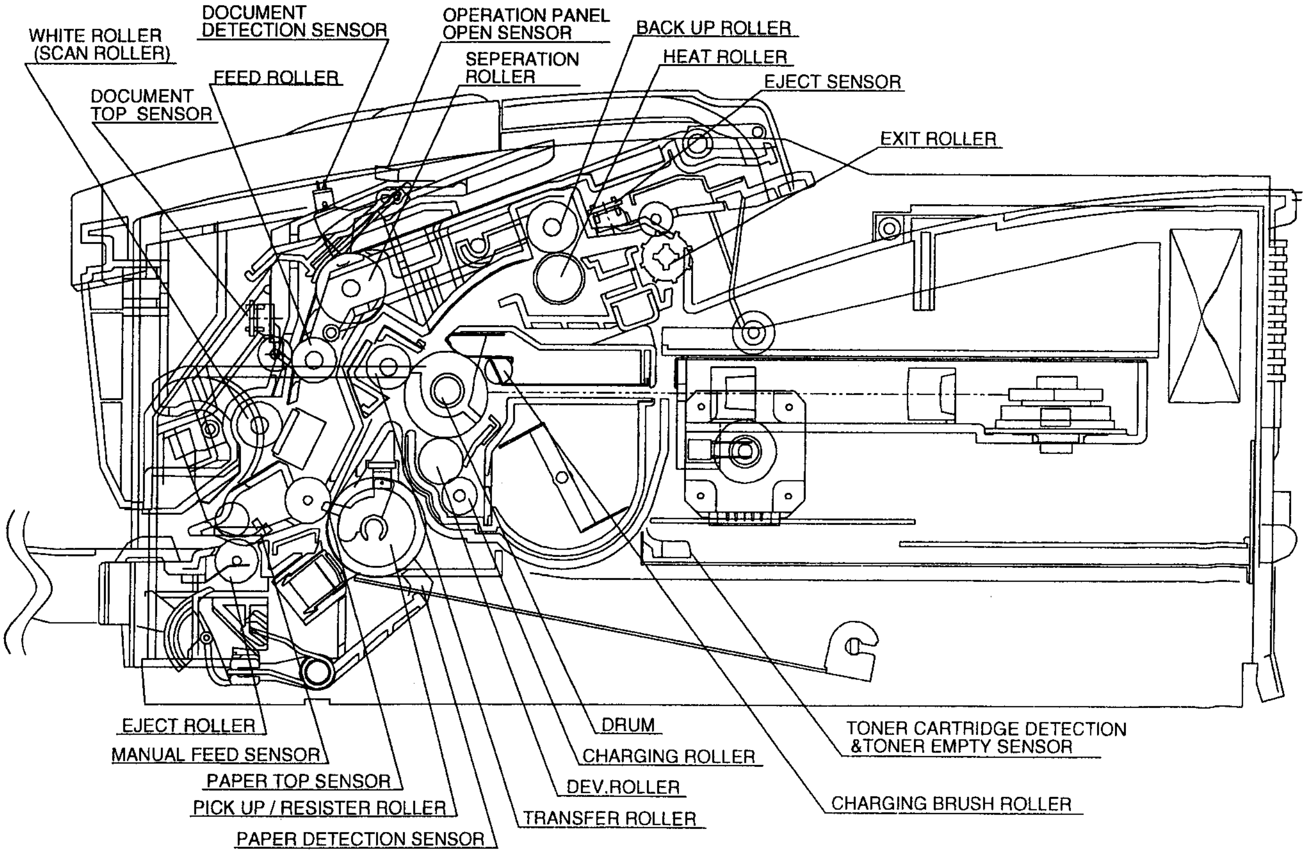
4) Determine causes
Determine the causes of the equipment problem by troubleshooting.

5) Equipment repairs
Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.

6) Confirm normal operation of the equipment
After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7) Record keeping
Make a record of the measures taken to rectify the problem for future reference.

2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS


WHITE ROLLER (SCAN ROLLER)
DOCUMENT DETECTION SENSOR
DOCUMENT TOP SENSOR
FEED ROLLER
OPERATION PANEL OPEN SENSOR
SEPERATION ROLLER
BACK UP ROLLER
HEAT ROLLER
EJECT SENSOR
EXIT ROLLER
EJECT ROLLER
MANUAL FEED SENSOR
PAPER TOP SENSOR
PICK UP / RESISTER ROLLER
PAPER DETECTION SENSOR
DRUM
CHARGING ROLLER
DEV.ROLLER
TRANSFER ROLLER
TONER CARTRIDGE DETECTION &TONER EMPTY SENSOR
CHARGING BRUSH ROLLER

2.1 MAINTENANCE LIST

NO.	OPERATION	CHECK
1	Document Path	Remove any foreign matter such as paper.
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly. Remove the paper and film cartridge before cleaning.
4	Target Glass, White Plate	If the target glass and white plate are dirty, clean the glass with a soft dry cloth.
5	Sensors	Paper sensor (P_SEN), R.P. sensor (RP_SW), Resister sensor (R_SEN), Scan cover open sensor (C_C-SW), Manual sensor (M_SW), Exit Sensor (E_SW).
6	Mirrors and Lens	If the mirrors and lens are dirty, clean them with a soft dry cloth.
7	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.

2.2 MAINTENANCE CYCLE

		Cleaning	Replacement	
No.	Item	Cycle	Cycle	Procedure
1	White (Scan) Roller (Ref. No.340)	3 months	7 years (100,000 documents)	Refer to DISASSEMBLY INSTRUCTIONS.(page 158)
2	Separation Roller (Ref. No.307)	3 months	7 years (100,000 documents)	Refer to DISASSEMBLY INSTRUCTIONS.(page 157)
3	Feed Roller (Ref. No.306)	3 months	7 years (100,000 documents)	Refer to DISASSEMBLY INSTRUCTIONS.(page 157)
4	Pick up / Resisit Roller (Ref. No.618)	3 months	7 years (100,000 documents)	Refer to DISASSEMBLY INSTRUCTIONS.(page 153)
5	Separation Pad (Ref. No.121)	3 months	7 years (100,000 documents)	(page 271)
6	Separation Pad (Ref. No.515)	3 months	7 years (100,000 documents)	(page 275)

These values are only standard ones and may vary depending on usage conditions.

3. MAINTENANCE

CLEANING

If white or black bands appear on a copied or transmitted document, clean the white roller.

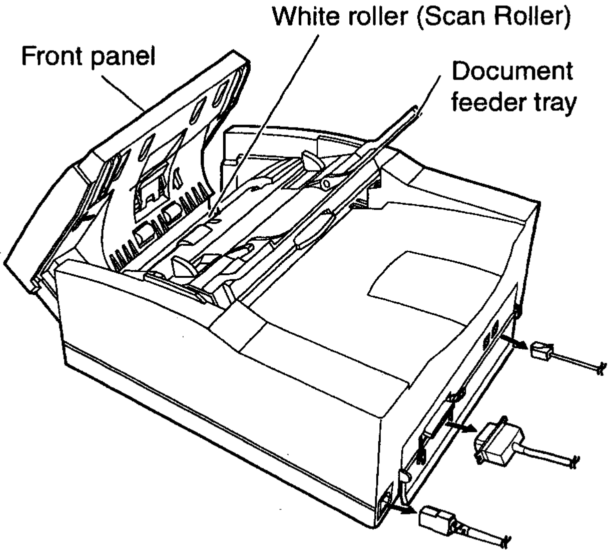
(1) Disconnect the printer cable, the power cord and the telephone line cord.

(2) Open the document feeder tray and the front panel.

(3) Clean the white roller with a cloth moistened with isopropyl rubbing alcohol by rotating the roller and let it dry thoroughly.

(4) Close the front panel securely by pushing down on both ends.

(5) Connect the printer cable, the power cord and the telephone line cord.



Caution:

- Do not use paper products, such as paper towels or tissues, to clean the white roller.

TROUBLESHOOTING GUIDE

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1. TROUBLESHOOTING SUMMARY

1. 1 TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

1. 2 PRECAUTIONS

1) If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper cassette is set correctly, and the paper is set correctly without any slack.
2) Before troubleshooting, first check that the connectors and cables are connected correctly (not loose). If the problem occurs randomly, check it very carefully.
3) When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
4) After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
5) Always test to verify that the unit is working normally.

1. 3 WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE *HELP* FUNCTION

- How to use: 1. Press **HELP** (**HILFE**).
  2. Press ▲ or ▼ until the desired item is displayed.
  3. Press **START/SET/COPY** (**START/⇨/KOPIE**)

*Words in brackets ( ) are German.

2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE LP (Service notw.LP)	There is sometuing wrong with the unit. Contact our service personal. • Polybon motor error. Replace LSU unit.
CALL SERVICE LB (Service notw.LB)	• Laser beam error. Replace LSU unit or HVPS.
CALL SERVICE FU (Service notw.FS)	• Fuser unit can not heat up. Replace fuser unit.
CHANGE DRUM Trommel wechsel	• The drum unit is being worn out. Replace the drum unit and toner cartridge with new ones as soon as possible.
CHECK DOCUMENT (Vorlage prüfen)	• The document is not fed into the unit properly. Reinsert the document.
CHECK DRUM (Prüfen Tonermmel)	• The drum unit is not inserted properly. Reinsert it correctly. • The installed drum is worn out. Replace the drum unit with a new one.
CHECK MEMORY (Speicher prüfen)	• Memory (telephone numbers, parameters, etc.) has been erased. Re-program. [The backup battery on the top of the digital board may be low or dead, so check it.]
CHECK TONER (Prüfe Toner)	• The toner cartridge is not installed properly. Reinsert it correctly.
DRUM LIFE OVER (Trommel Ende)	• The drum unit has reached the end of its life expectancy. Replace the drum unit and toner cartridge with new ones.
FAILED PICK UP (Fehleinzug)	• The unit cannot pick up the recording paper loaded in the paper cassette. Remove the paper cassette and clear the jammed paper. (see page 33)
FAX IN MEMORY (Fax im Speicher)	• The unit has a document in memory. See the other message instructions to print out the document.
FAX MEMORY FULL (Speicher voll)	• Memory is full of received documents due to a lack of recording paper or a recording paper jam etc. Install paper or clear the jammed paper. • When performing memory transmission, the document being stored exceeds the memory capacity of the unit. Transmit the entire documents using manual or automatic transmission.
EASY DIAL FULL (JOG-DIAL voll)	• There is no space to store new stations in the JOG DIAL directory. Edit or erase unnecessary stations.
MEMORY FULL (Speicher voll)	• When making a copy, the document being stored exceeds the memory capacity of the unit. Press STOP to clear the message. Divide the documents and try again.
MODEM ERROR (Modemfefler)	• There is something wrong with the modem circuit. Contact our service personnel.
NO FAX REPLY (Keine Faxantw)	• The other party's fax machine is busy or has run out of recording paper. Try again.
OUT OF PAPER (Papier alle)	• The recording paper is not installed or the unit has run out of paper. Install paper.
PANEL OPEN (Bedienf.offen)	• The front panel is open. Close it.
PAPER JAMED (Papierstau)	• A recording paper jam occurred. Clear the jammed paper. [If the printout jams, please refer to Fig. a. on the 32 page.]

DISPLAY MESSAGE	CAUSE AND REMEDY
PC FALL OR BUSY (PC Verbind.Fehl)	• The fax function cannot be operated by the PC. The printer cable is not connected correctly, or the software is not running on the PC.
PLEASE WAIT (Bitte walten)	• The top cover was closed. Wait a while. • **START/SET/COPY** was pressed during the power save mode. Wait a while.
REDIAL TIME OUT (WW Zeitablauf)	• The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT (Stau beseitigen)	• The document is jammed. Remove the jammed document. • Attempted to transmit a document longer than 600 mm (23$^{5}/_{8}$"). Press the **STOP** button to remove the document. Divide the document into two or more sheets and try again. [Alternately, turn off service code #559 to enable sending of documents longer than 600 mm.]
REMOVE PAPER (Papier entfen.)	• Paper was placed on the paper tray for manual feeding without first pressing **START/SET/COPY**Remove the paper. When the "Bitte warten" message disappears, place the paper on the paper tray. • The paper cassette is not inserted correctly. Insert it correctly.
TONER EMPTY (Toner alle)	• The toner is empty. Replace the toner cartridge and drum unit with new ones.
TONER LOW (Toner schwach)	• The remaining toner is low. Replace the toner cartridge and drum unit with new ones as soon as possible.
TOP COVER OPEN (Deckel offen)	• The top cover is open. Close it.
TRASMIT ERROR (Ubelrtr.Fehler)	• Transmission error occurred. Try again.
UNIT OVERHEATED (Thermokopf heiß)	• The unit is too hot. Let the unit cool down.
USE 1 FEED ONLY (Nur 1Blatt einf)	• When making transmission or copying, another sheet was placed on the paper tray. Remove it from the paper tray and try again.
WRONG PAPAER (Paper falsch)	• The unit printed on paper which is shorter than letter size paper. To prevent the drum unit becoming dirty, use letter or legal size paper and set the correct recording paper size in feature setting #16. (see page 36)
KX-FLM600G ONLY (Empf.Fehler)	• Receiving error occurred.

*The explanations given in the [ ] are for servicemen only.
*Words in brackets ( ) are German.

KX-FLM600G

Remove the jammed paper as follows.

• If paper has jammed on the drum unit

(1) Remove the jammed paper carefully.

Caution:

- Do not touch or scratch the green drum surface as this may damage the drum unit.

(2) Close the top cover securely by pushing down on the dotted area at both ends.

• If paper has jammed in the fuser unit

(1) Pull the jammed paper out carefully.

Caution:

- Do not touch or scratch the green drum surface as this may damage the drum unit.

(2) Close the top cover securely by pushing down on the dotted area at both ends.

Note:

- If the jammed paper cannot be found, it may have stopped under the drum unit.

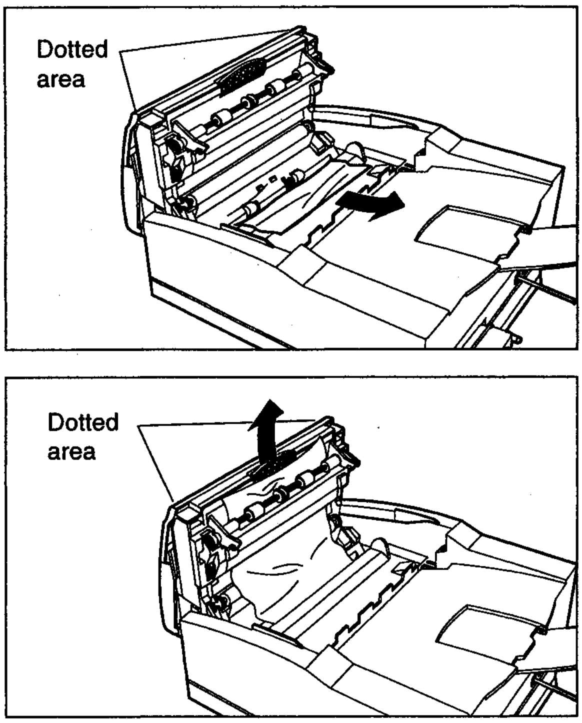
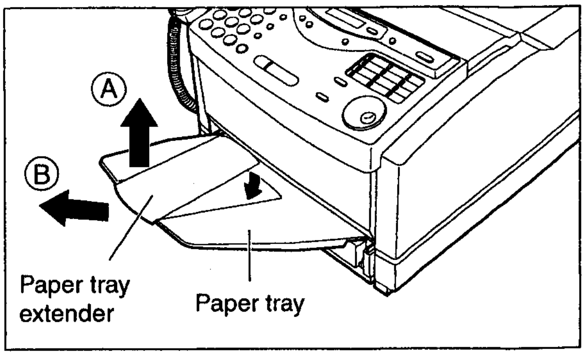


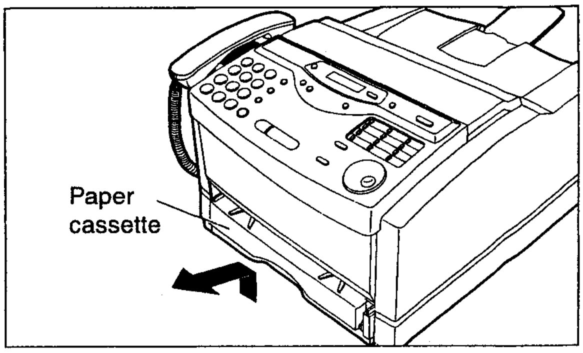
Fig. a

- **If "FAILED PICK UP" is displayed**

(1) Close the paper tray extender and remove the paper tray by (A) slightly lifting and (B) pulling it out of the unit.


Ⓐ
Ⓑ
Paper tray extender
Paper tray

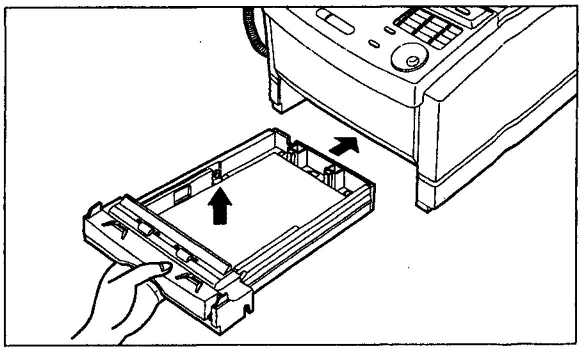
(2) Lift the paper cassette up slightly and pull it out of the unit.


Paper cassette

(3) Remove the jammed recording paper.

(4) Insert the paper cassette into the unit until it clicks into place.

(5) Replace the paper tray and open the paper tray extender.



3. TROUBLESHOOTING DETAILS

3.1 OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method.
If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on page 35. Difficult problems may be hard to determine, so repeated testing is necessary.

3.2 TROUBLESHOOTING ITEMS TABLE

ITEM	SYMPTOM	SEE THIS PAGE.
ADF (Auto Document Feeder)	The document does not feed.	53
	Document jam	54
	Multiple feed	55
	Skew	56
Recording paper feed	The recording paper does not feed.	50
	Paper jam	51
	Multiple feed and skew	48, 49
Printing	The sent fax data is skewed.	57
	The received fax data is skewed.	57
	The received or copied data is expanded.	46
	Blank print.	47
	Blank ,white point.	40
	Dark vertical line	39
	Ghost Image lateral line	58
	An abnormal image is copied.	
Communication FAX, TEL (analog board)	Cannot communicate by fax.	59
	An error code is displayed.	59
	Cannot talk.	92
	The DTMF tone doesn't work.	92
	The handset/monitor doesn't work, etc.	92
Operation panel	Keys are not accepted.	96
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	97

3.3 SIMPLE CHECK LIST

SERIAL NO. ____________ DATE ____________

FUNCTION		JUDGEMENT	REFERENCE
FAX operaton	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
PC operation	PANA LINK Transmission	OK / NG	
	PANA LINK Receiving	OK / NG	
	PANA LINK scan	OK / NG	
	PC Print	OK / NG	
Telephone operation	Handset transceiver/ receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code 815※
Operation panel	Key check	OK / NG	Service code 561※
	LED check	OK / NG	Service code 557※
	LCD check	OK / NG	Service code 558※
Sensor	Sensor check	OK / NG	Service code 815※
Clock	Sensor check	OK / NG	Is the time kept correctly? Check with another clock.
EXT-TAM	Handset tranceiver/receiver	OK / NG	
	Remote control	OK / NG	

※ Check according to the service code referring to the Test function on pages 130 and 131.

3.4 SIMPLIFIED TROUBLESHOOTING LIST

[ ]means Ref.No.

	Symptom	Possible Cause	Remedy
1	Can not print. (Nothing is printed.)	The laser does not light.	Replace the laser unit. [13]
		The data is not received.	Check the board. [PCB7]
2	Can not print. (The whole page is black with the frame.)	The laser keeps lighting.	Replace the laser unit or check the board. [PCB5]
3	Can not print. (The whole page is black without the frame.)	The unit is not charged with electricity.	Replace the OPC unit or check the high voltage board.
4	White vertical lines	Some dusts are attached on the laser unit.	Clean the glass of the laser unit. [13]
		Some dusts are attached on DEV roller.	Replace the DEV unit. [A8]
		The shading data is not correct.	Take the shading data again.
5	Black vertical lines	Some dusts are attached on DEV roller.	Replace the DEV unit. [A8]
		OPC drum is dirty with the toner.	Clean the OPC drum. [A7]
		The shading data is not correct.	Take the shading data again.
		CIS is dirty.	Clean the glass of CIS. [361]
6	White horizontal lines	The gear is dirty or broken.	Replace the gear. [A8]
		The torque of DEV unit is heavy.	Replace the DEV unit. [A8]
7	Black horizontal lines	OPC drum is scratched.	Replace the OPC unit. [A7]
8	White dots	The scratch of OPC (94mm pitch)	Replace the OPC unit. [A7]
		The scratch of DEV roller (22mm pitch)	Replace the DEV unit. [A8]
9	Black dots	The scratch of OPC (94mm pitch)	Replace the OPC unit. [A7]
		OPC is dirty. (94mm pitch)	Clean the OPC unit. [A7]
		The scratch of DEV roller (22mm pitch)	Replace the DEV unit. [A8]
10	The recording paper is dirty. (both sides of the recording paper)	The toner is leaked from the side of DEV roller.	Replace the DEV unit. [A8]
11	The recording paper is dirty. (the front and rear of the recording paper)	The paper path is dirty.	Clean the paper path.
		The setting of recording paper at KX-FLM600 is incorrect.	Set the paper size according to the paper in the cassette.
12	The recording paper is dirty. (the whole page)	The toner is leaked.	Replace the OPC unit. [A7]
13	The recording paper is dirty. (back side)	The transcription roller is dirty.	Clean the transcription roller. [234]
		The setting of recording paper at KX-FLM600 is incorrect.	Set the paper size according to the paper in the cassette.
14	The ghost appears on the paper.	The transcription voltage is low.	Replace the high voltage board. [PCB5]
		The recording paper is too thick.	Use the paper between 16lb and 24lb.
15	The printed letters on the envelope is dirty	The envelope that contains cotton is used.	Change the kind of envelope.
		PC is not set to envelop mode.	Set PC to envelop.
16	The printed letters on the OHP is dirty.	The transcription voltage is low or too high.	Replace the high voltage board. [PCB5]
		The recommended OHP sheet is not used.	Use CG3300 or CG5000.
17	The printed letters in black are not clear.	The toner in DEV unit is a little.	Replace the DEV unit. [A8]
		The laser unit is dirty.	Clean the glass of the laser unit. [13]
18	The printed letters are uneven.	The toner in DEV unit is a little.	Replace the DEV unit. [A8]
		The laser unit is dirty.	Clean the glass of the laser unit. [13]
19	The printing paper is jammed.	The heat roller does not separate smoothly.	Clean or replace the heat roller. [219]
		The sensor does not work.	Replace the sensor or check the board. [PCB8]
		The recording paper is set to the paper tray.	Take out the papers from the paper tray.
		The recording paper is too thin.	Use the paper between 16lb and 24lb.
20	The printing paper is jammed. (The paper does not come out from the cassette.)	Too many recording papers are inserted in the tray.	Reduce the paper to the limit label in the tray.
		The recording paper is too thick.	Use the paper between 16lb and 24lb.
		The rear-end guide of cassette does not fit to the recording paper.	Fit the rear-end guide of cassette to the recording paper.

[ ]means Ref.No.

	Symptom	Possible Cause	Remedy
21	Some printing papers are fed simultaneously.	The separator of recording paper is dirty.	Clean the printing paper separator. [516]
22	The printing paper is skewed.	Too many recording papers are inserted in the tray.	Reduce the paper to the limit label in the tray.
		The recording paper is too thick.	Use the paper between 16lb and 24lb.
23	The printing paper is waved	The heat roller does not separate smoothly.	Clean or replace the heat roller. [219]
24	The printing paper is wrinkled.	The recording paper is too thin.	Use the paper between 16lb and 24lb.
25	The document is jammed.	The sensor does not work.	Replace the sensor or check the board.
26	Some documents are fed	The separator of the document is dirty.	Clean the document separator. [121]
27	The document is skewed.	The document slider is not set to the document properly.	Set the document slider to the document properly.
28	Can not copy. (The whole page is white.) (PC printing is OK.)	CIS is broken.	Replace the CIS. [361]
		AK8414 of printer controller board is broken	Replace AK8414. [U9]
29	Can not copy. (The whole page is	CIS is broken.	Replace the CIS. [361]
30	Can not copy. (The image is distorted.) (PC printing is OK.)	CIS is broken.	Replace the CIS. [361]
31	Can not feed the paper manually.	The unit is in the sleep mode.	Press the START button before manual feeding. Then insert the paper to the manual feeder after the warming-up.
32	Can not feed the paper manually. (After warming-up)	The manual feed sensor does not work.	Replace the sensor or check the board.
33	Can not feed the paper manually. (Paper jam)	The recording paper is not set properly.	Match the recording paper to the mark of tray.
		The recording paper is too thick.	Use the paper between 16lb and 28lb.
		The papers are not made neat.	Make the recording papers neat, then set them into the cassette.
34	The paper is skewed when feeding manually.	The recording paper is set skewed.	Set the paper straight.
		The recording paper is too thick.	Use the paper between 16lb and 28lb.
35	The legal printing can not be done.	FLM600 is not set to the Legal.	Set KX-FLM600 to the Legal.
36	The copy is light (whitish).	CIS is broken.	Replace the CIS. [361]
		Shading data is destroyed.	Do the shading again.
37	The document is not drawn in.	The document detection sensor does not work.	Replace the sensor or check the board.
38	CHECK DRUM appears.	The OPC unit is out of conduction.	Replace the OPC unit. [A7]
		The contact with the terminal of main body is bad.	Check the deformation of the terminal of main body, then repair it.
39	CHECK TONER appears.	The toner is inclined to one side.	Shake the toner cartridge. Initialize two or three times.
		The gears of DEV unit are assembled improperly.	Replace the DEV unit. [A8]
		The sensor does not work.	Replace the sensor. [PC1 on PCB6]
40	PAPER JAM is displayed.	The resist sensor is broken.	Replace the sensor. [PCB8]
		The paper-discharging sensor is broken.	Replace the sensor. [PCB10]
41	OUT OF PAPER is displayed.	The paper sensor is broken.	Replace the sensor. [PCB9]
42	COVER OPEN is displayed.	The interlock SW is broken.	Replace the sensor. [PCB5]
43	TONER LOW is displayed.	The gears in the DEV unit are assembled improperly.	Replace the DEV unit.
44	CHECK DOCUMENT is displayed.	The document sensor is broken.	Replace the sensor. [PI301 on PCB3]

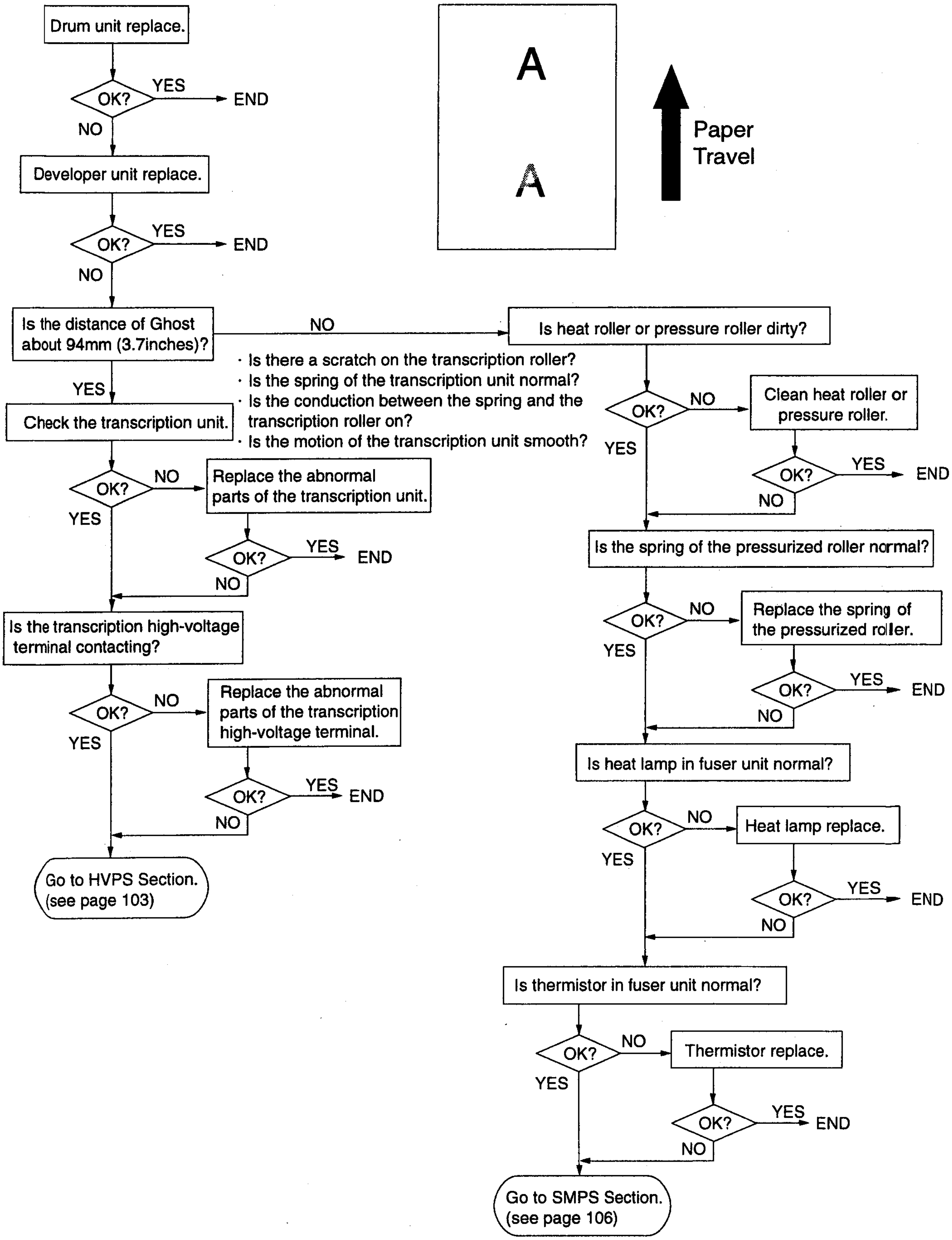
3.5 Q & A

[ ]means Ref.No.

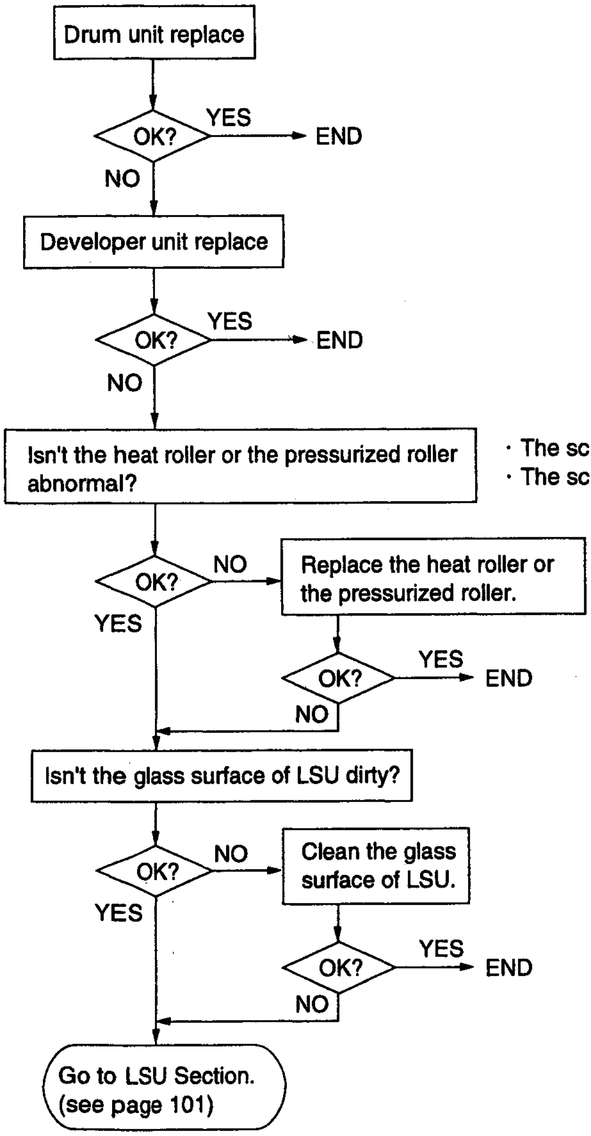
	Symptom	Possible Cause	Remedy
1	White vertical lines	Some dusts are attached on DEV	Replace the DEV unit. [A8]
2	Black vertical lines	Some dusts are attached on DEV	Replace the DEV unit. [A8]
		The shading data is not correct.	Take the shading data again.
3	White horizontal lines	The torque of DEV unit is heavy.	Replace the DEV unit. [A8]
4	Black horizontal lines	OPC drum is scratched.	Replace the OPC unit. [A7]
5	White dots	The scratch of OPC (94mm pitch)	Replace the OPC unit. [A7]
		The scratch of DEV roller (22mm pitch)	Replace the DEV unit. [A8]
6	Black dots	The scratch of OPC (94mm pitch)	Replace the OPC unit. [A7]
		OPC is dirty. (94mm pitch)	Clean the OPC unit. [A7]
		The scratch of DEV roller (22mm pitch)	Replace the DEV unit. [A8]
7	The recording paper is dirty. (both sides of the recording paper)	The toner is leaked from the side of DEV roller.	Replace the DEV unit. [A8]
8	The recording paper is dirty. (the front and rear of the recording paper)	The setting of recording paper at KX-FLM600 is incorrect.	Set the paper size according to the paper in the cassette.
9	The recording paper is dirty. (the whole page)	The toner is leaked.	Replace the OPC unit. [A7]
10	The recording paper is dirty. (back side)	The setting of recording paper at KX-FLM600 is incorrect.	Set the paper size according to the paper in the cassette.
11	The ghost appears on the paper.	The recording paper is too thick.	Use the paper between 16lb and 24lb.
12	The printed letters on the envelope is dirty.	The envelope that contains cotton is used.	Change the kind of envelope.
		PC is not set to envelop mode.	Set PC to envelop.
13	The printed letters on the OHP is dirty.	The recommended OHP sheet is not used.	Use CG3300 or CG5000.
14	CHECK TONER appears.	The toner in DEV unit is a little.	Replace the DEV unit. [A8]
15	The printed letters are uneven.	The toner in DEV unit is a little.	Replace the DEV unit. [A8]
16	The printing paper is jammed.	The recording paper is set to the manual feeder.	Take out the papers from manual feeder.
		The recording paper is too thin.	Use the paper between 16lb and 24lb.
17	The printing paper is jammed. (The paper does not come out from the cassette.)	Too many recording papers are inserted in the tray.	Reduce the paper to the limit label in the tray.
		The recording paper is too thick.	Use the paper between 16lb and 24lb.
		The rear-end guide of cassette does not fit to the recording paper.	Fit the rear-end guide of cassette to the recording paper.
18	Some printing papers are fed simultaneously.	The separator of recording paper is dirty.	Clean the printing paper separator. [516]
19	The printing paper is skewed.	Too many recording papers are inserted in the tray.	Reduce the paper to the limit label in the tray.
		The recording paper is too thick.	Use the paper between 16lb and 24lb.
20	The printing paper is wrinkled.	The recording paper is too thin.	Use the paper between 16lb and 24lb.
21	Some documents are fed	The separator of the document is dirty.	Clean the document separator.[121]
22	The document is skewed.	The document slider is not set to the document properly.	Set the document slider to the document properly. [121]
23	Can not feed the paper manually.	The unit is in the sleep mode.	Press the START button before manual feeding. Then insert the paper to the manual feeder after the warming-up.
24	Can not feed the paper manually. (Paper jam)	The recording paper is not set properly.	Match the recording paper to the mark of tray.
		The recording paper is too thick.	Use the paper between 16lb and 28lb.
		The papers are not made neat.	Make the recording papers neat, then set them into the cassette.
25	The paper is skewed when feeding manually.	The recording paper is set skewed. The recording paper is too thick.	Set the paper straight. Use the paper between 16lb and 28lb.
26	The legal printing can not be done.	KX-FLM600 is not set to the Legal.	Set KX-FLM600 to the Legal.
27	CHECK TONER appears.	The toner is inclined to one side.	Shake the toner cartridge. Initialize two or three times.

3.6 PRINT

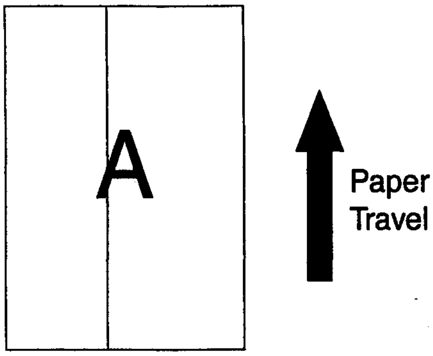
3.6-(1) Ghost Image


Drum unit replace.
OK?
YES
END
NO
Developer unit replace.
OK?
YES
END
NO
A
A
Paper Travel
Is the distance of Ghost about 94mm (3.7inches)?
NO
YES
Check the transcription unit.
· Is there a scratch on the transcription roller?
· Is the spring of the transcription unit normal?
· Is the conduction between the spring and the transcription roller on?
· Is the motion of the transcription unit smooth?
OK?
NO
Replace the abnormal parts of the transcription unit.
OK?
YES
END
NO
YES
Is the transcription high-voltage terminal contacting?
OK?
NO
Replace the abnormal parts of the transcription high-voltage terminal.
OK?
YES
END
NO
YES
Go to HVPS Section. (see page 103)
Is heat roller or pressure roller dirty?
OK?
NO
Clean heat roller or pressure roller.
OK?
YES
END
NO
YES
Is the spring of the pressurized roller normal?
OK?
NO
Replace the spring of the pressurized roller.
OK?
YES
END
NO
YES
Is heat lamp in fuser unit normal?
OK?
NO
Heat lamp replace.
OK?
YES
END
NO
YES
Is thermistor in fuser unit normal?
OK?
NO
Thermistor replace.
OK?
YES
END
NO
YES
Go to SMPS Section. (see page 106)

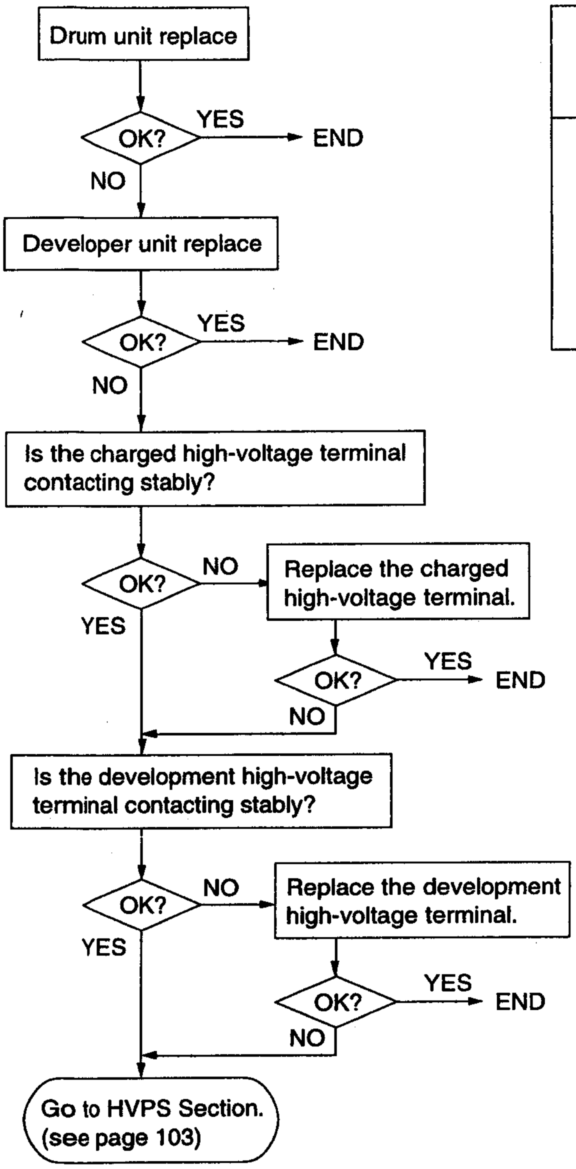
3.6-(2) Dark Vertical Line

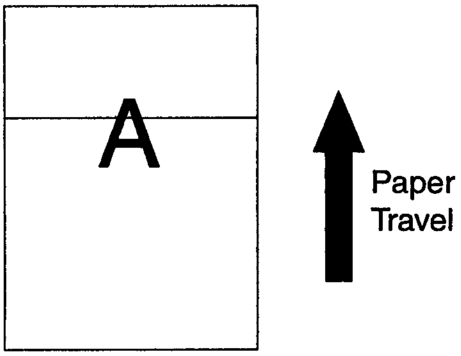

Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Isn't the heat roller or the pressurized roller abnormal?
OK?
NO
Replace the heat roller or the pressurized roller.
YES
OK?
YES
END
NO
Isn't the glass surface of LSU dirty?
OK?
NO
Clean the glass surface of LSU.
YES
OK?
YES
END
NO
Go to LSU Section. (see page 101)

- The scratch and dirt of the heat roller
- The scratch and dirt of the pressurized roller


A
Paper Travel

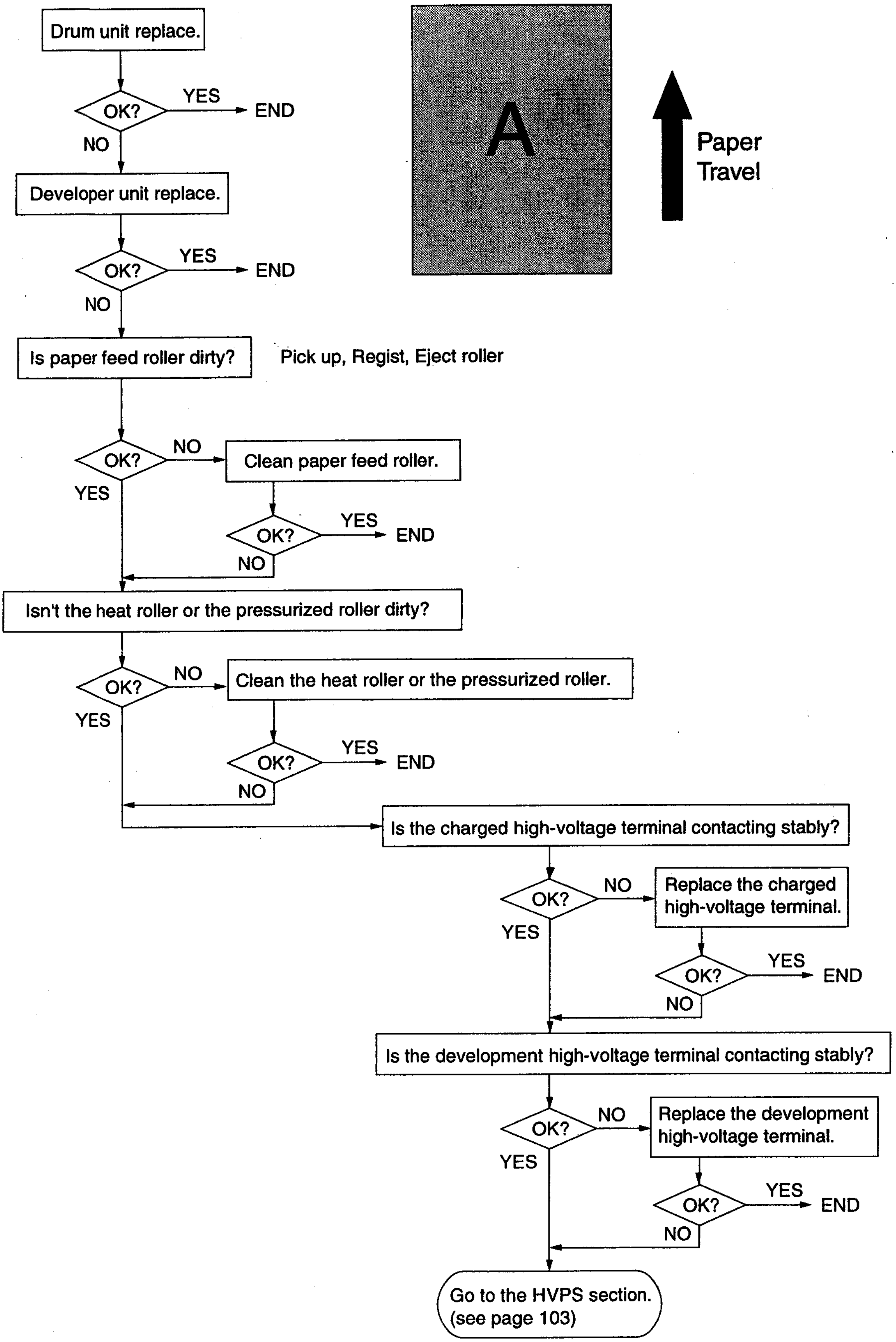
3.6-(3) Dark or White Horizontal Line


Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to HVPS Section. (see page 103)

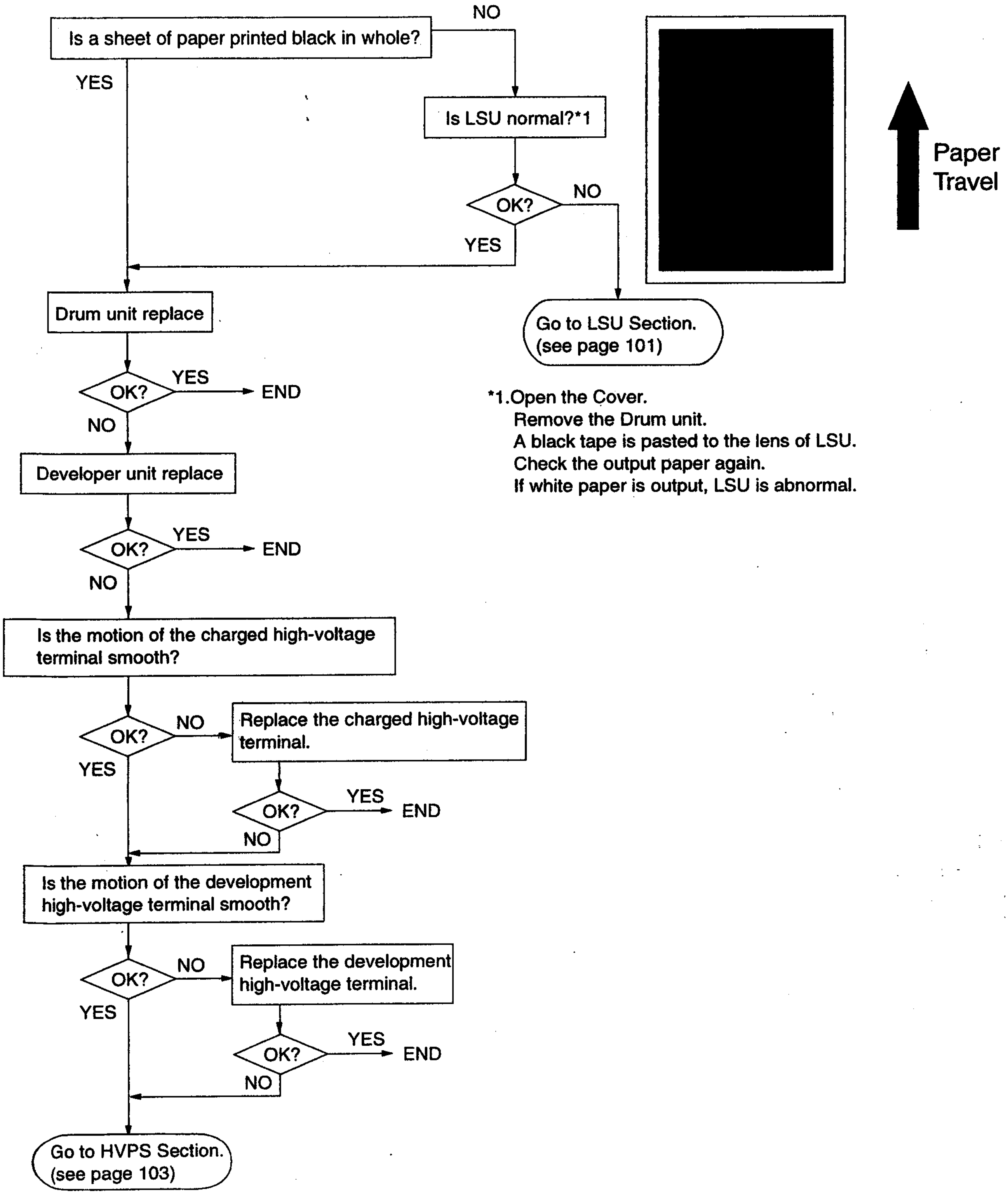

A
Paper Travel

- It is necessary to describe the information about the lines that cannot be troubleshooted in such as halftone.
- When there is the information about the troubleshooted horizontal line, please add the description of it.

3.6-(4) Dirty and Half Darkness Background

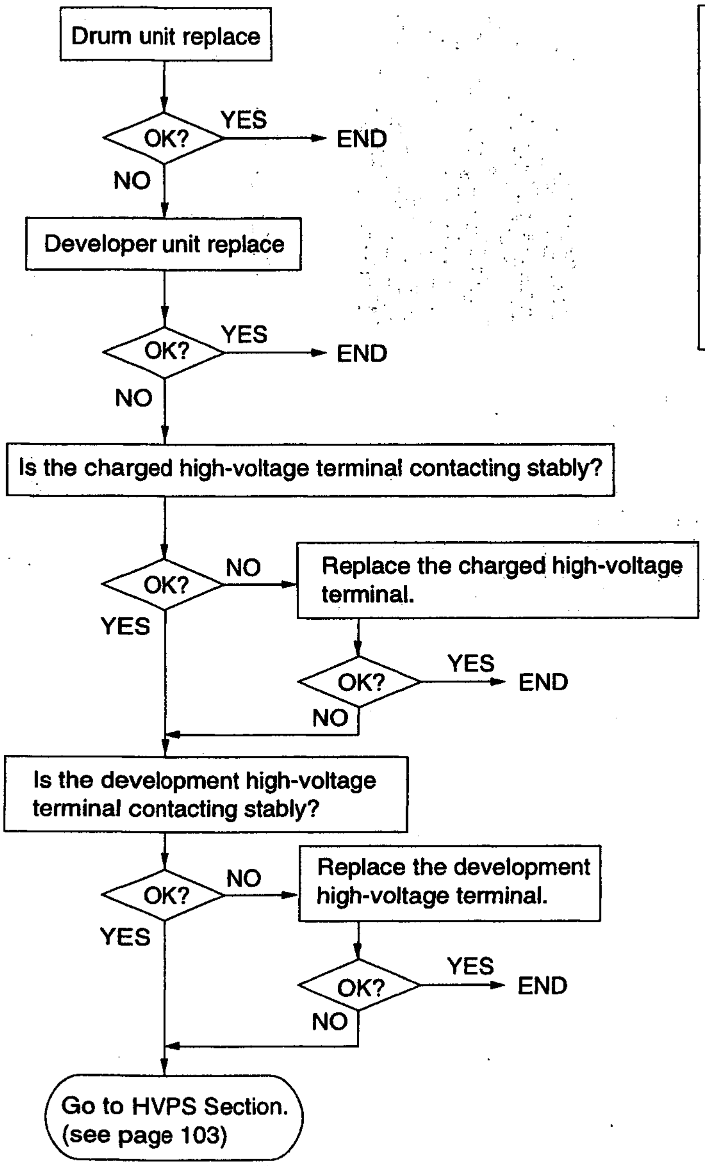

A
Paper Travel
Drum unit replace.
OK?
YES
END
NO
Developer unit replace.
OK?
YES
END
NO
Is paper feed roller dirty?
Pick up, Regist, Eject roller
OK?
NO
Clean paper feed roller.
YES
OK?
YES
END
NO
Isn't the heat roller or the pressurized roller dirty?
OK?
NO
Clean the heat roller or the pressurized roller.
YES
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to the HVPS section. (see page 103)

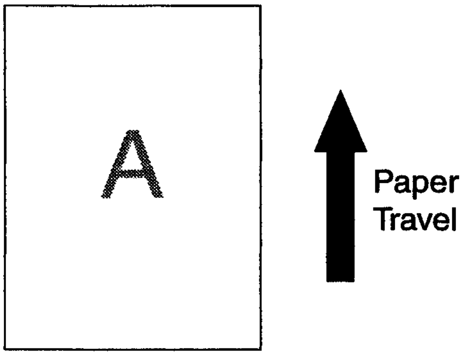
3.6-(5) Black print


Is a sheet of paper printed black in whole?
NO
YES
Is LSU normal?*1
OK?
NO
YES
Go to LSU Section.
(see page 101)
Paper
Travel
Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Is the motion of the charged high-voltage terminal smooth?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the motion of the development high-voltage terminal smooth?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to HVPS Section.
(see page 103)

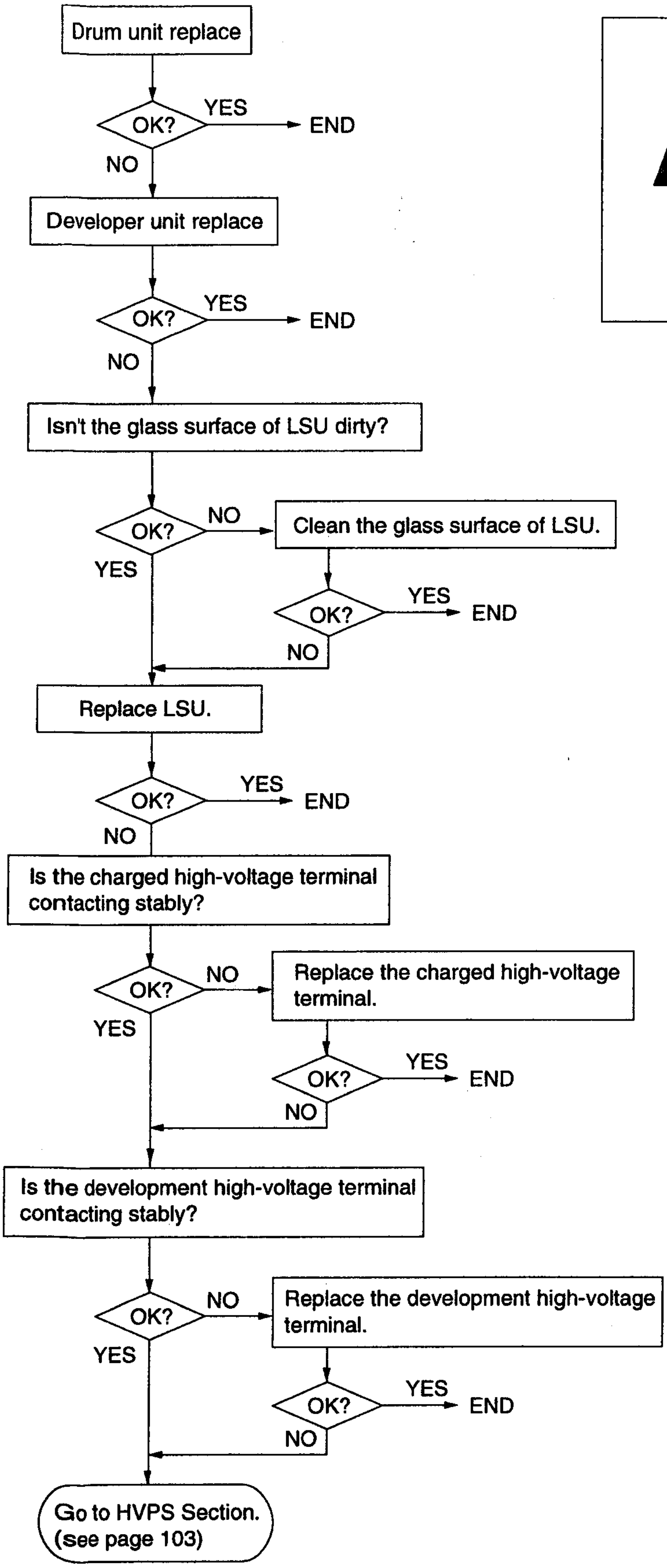
*1.Open the Cover.
Remove the Drum unit.
A black tape is pasted to the lens of LSU.
Check the output paper again.
If white paper is output, LSU is abnormal.

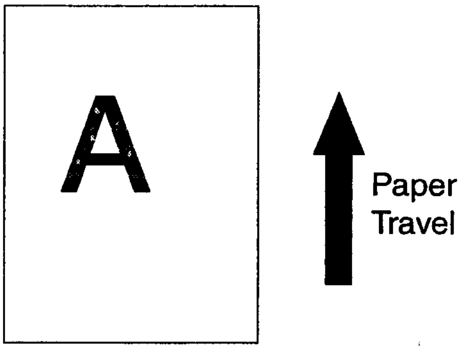
3.6-(6) Light Print


Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to HVPS Section. (see page 103)

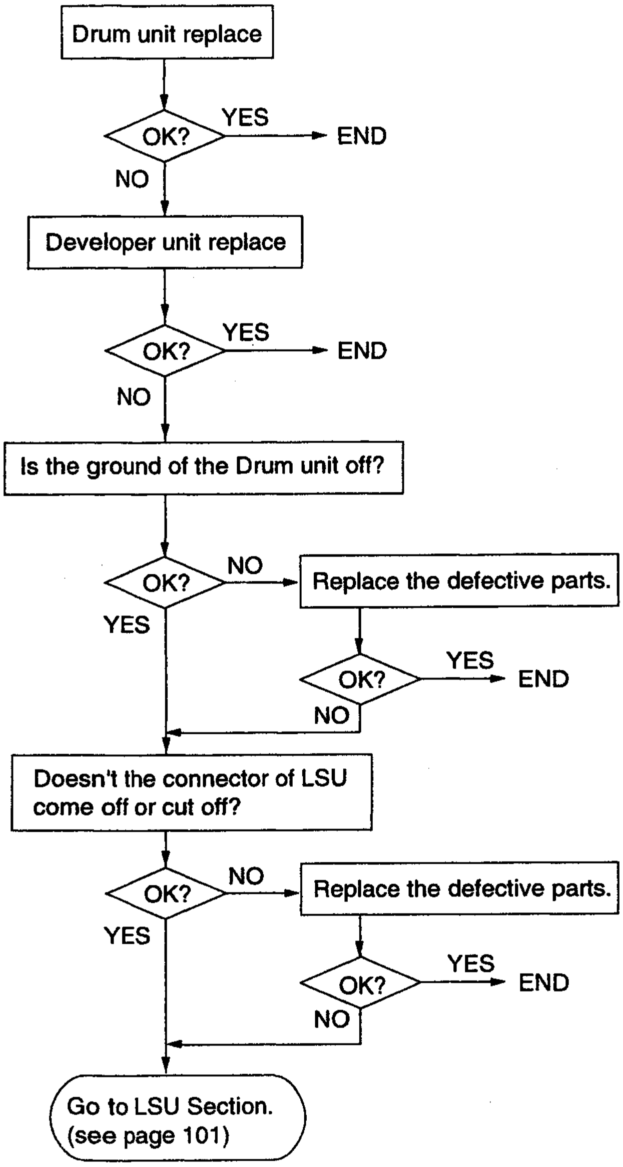

A
Paper Travel

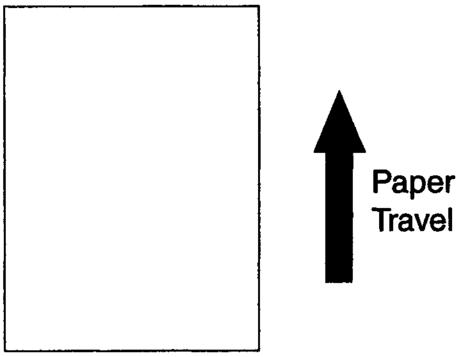
3.6-(7) Black density is light or uneven.


Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Isn't the glass surface of LSU dirty?
OK?
NO
Clean the glass surface of LSU.
YES
OK?
YES
END
NO
Replace LSU.
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to HVPS Section. (see page 103)

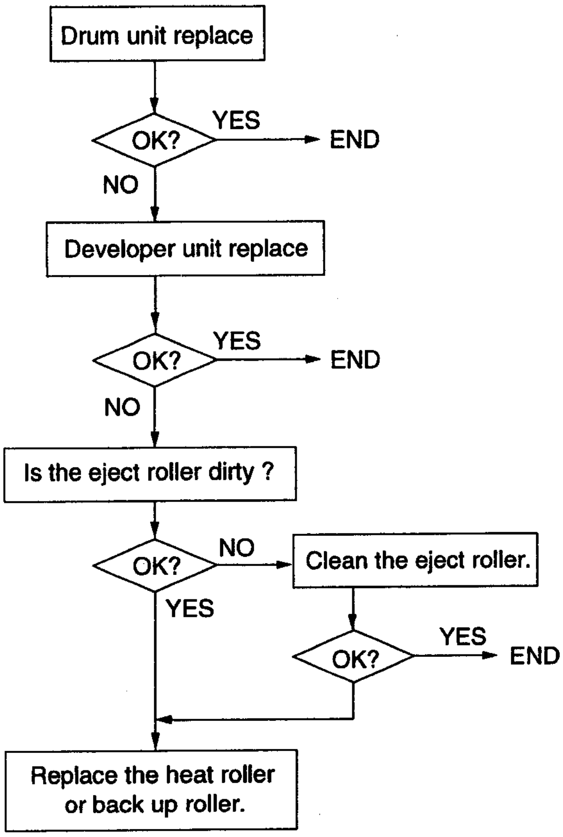

A
Paper Travel

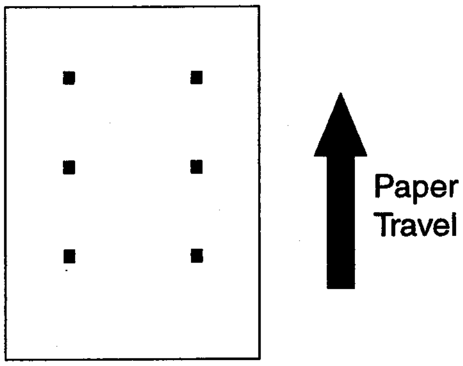
3.6-(8) Blank Print

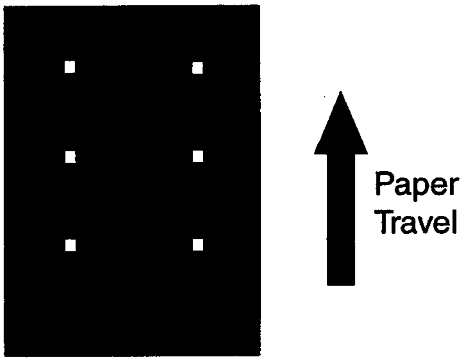

Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Is the ground of the Drum unit off?
OK?
NO
Replace the defective parts.
YES
OK?
YES
END
NO
Doesn't the connector of LSU come off or cut off?
OK?
NO
Replace the defective parts.
YES
OK?
YES
END
NO
Go to LSU Section.
(see page 101)


Paper
Travel

3.6-(9) Black, White Point

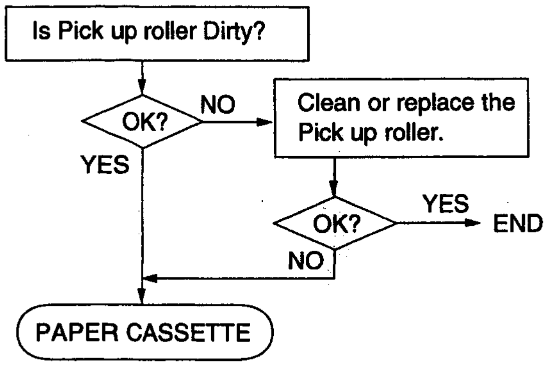

Drum unit replace
OK?
YES
END
NO
Developer unit replace
OK?
YES
END
NO
Is the eject roller dirty ?
OK?
NO
Clean the eject roller.
YES
OK?
YES
END
Replace the heat roller or back up roller.


Paper Travel

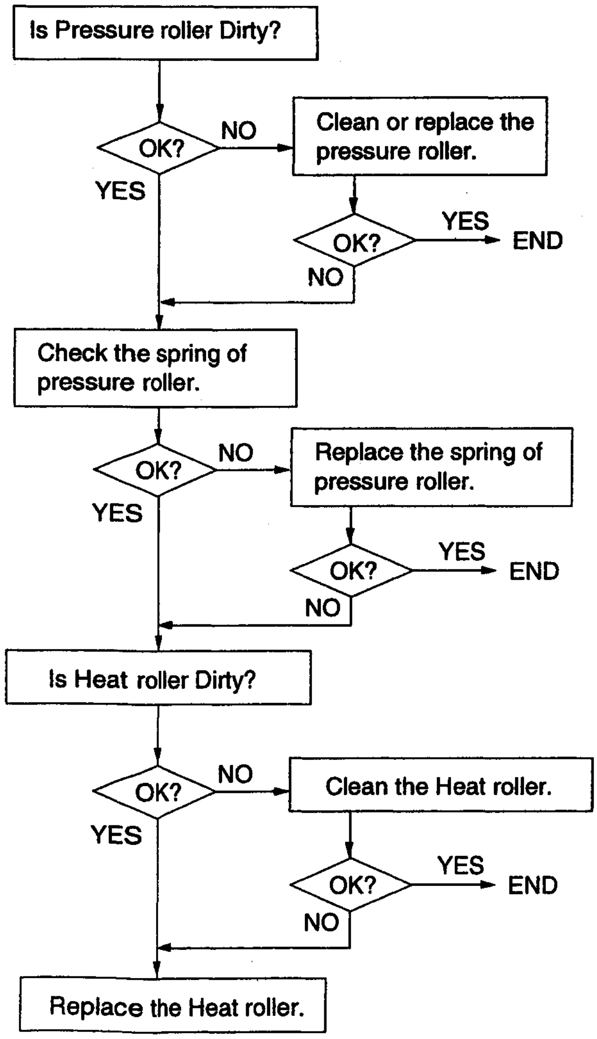

Paper Travel

3.7 RECORDING PAPER FEED

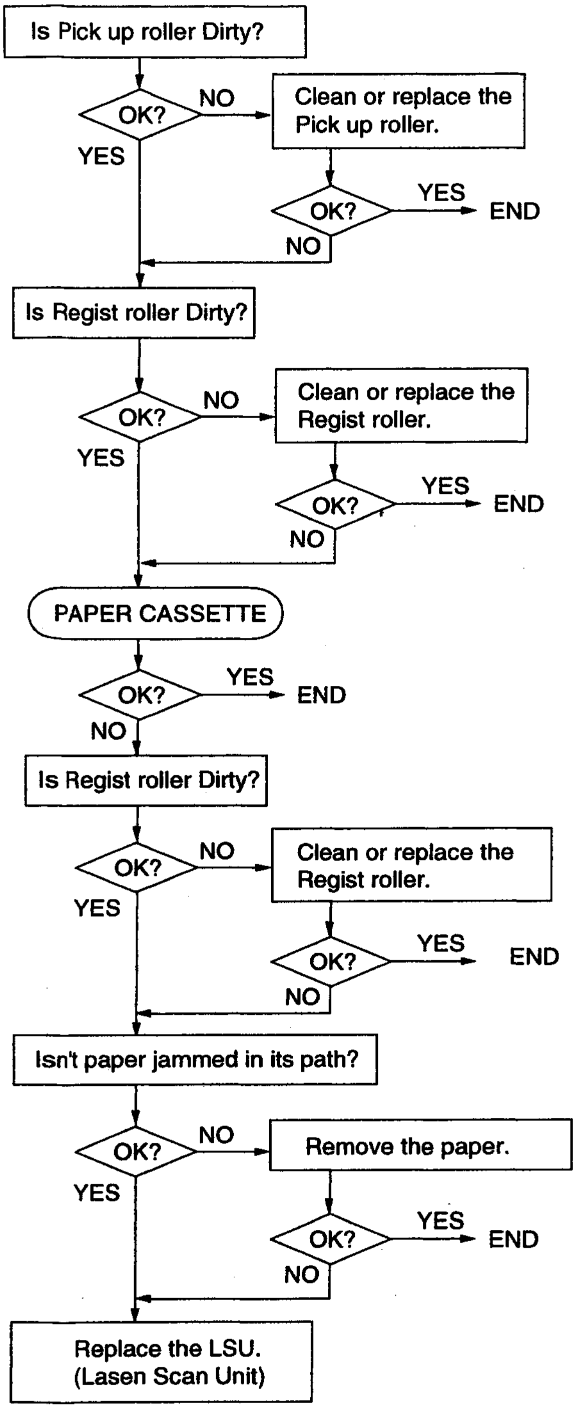
3.7-(1) Multiple feed


Is Pick up roller Dirty?
OK?
NO
YES
Clean or replace the Pick up roller.
OK?
YES
END
NO
PAPER CASSETTE

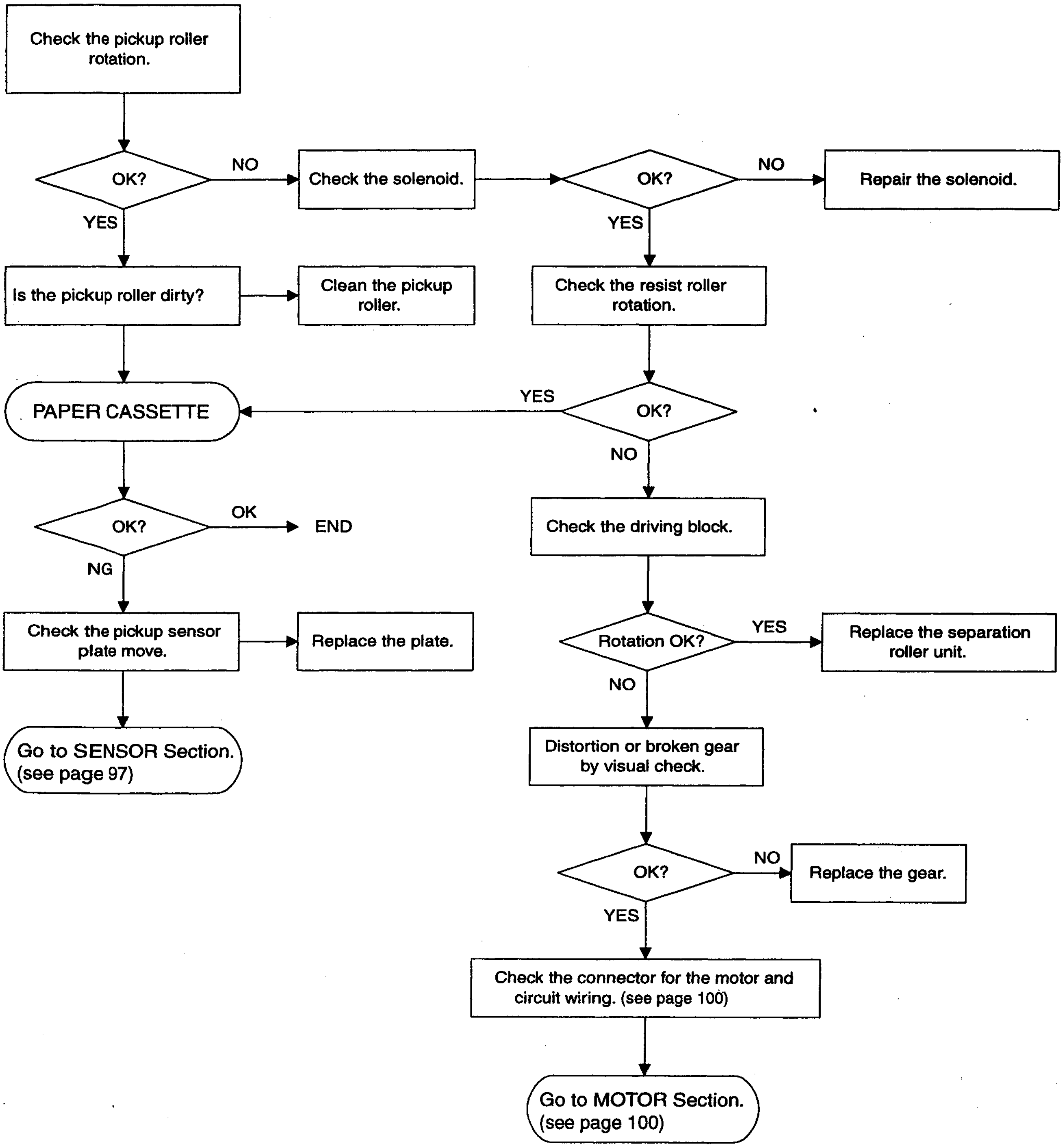
3.7-(2) The printing paper is waved or wrinkled


Is Pressure roller Dirty?
OK?
NO
YES
Clean or replace the pressure roller.
OK?
YES
END
NO
Check the spring of pressure roller.
OK?
NO
YES
Replace the spring of pressure roller.
OK?
YES
END
NO
Is Heat roller Dirty?
OK?
NO
YES
Clean the Heat roller.
OK?
YES
END
NO
Replace the Heat roller.

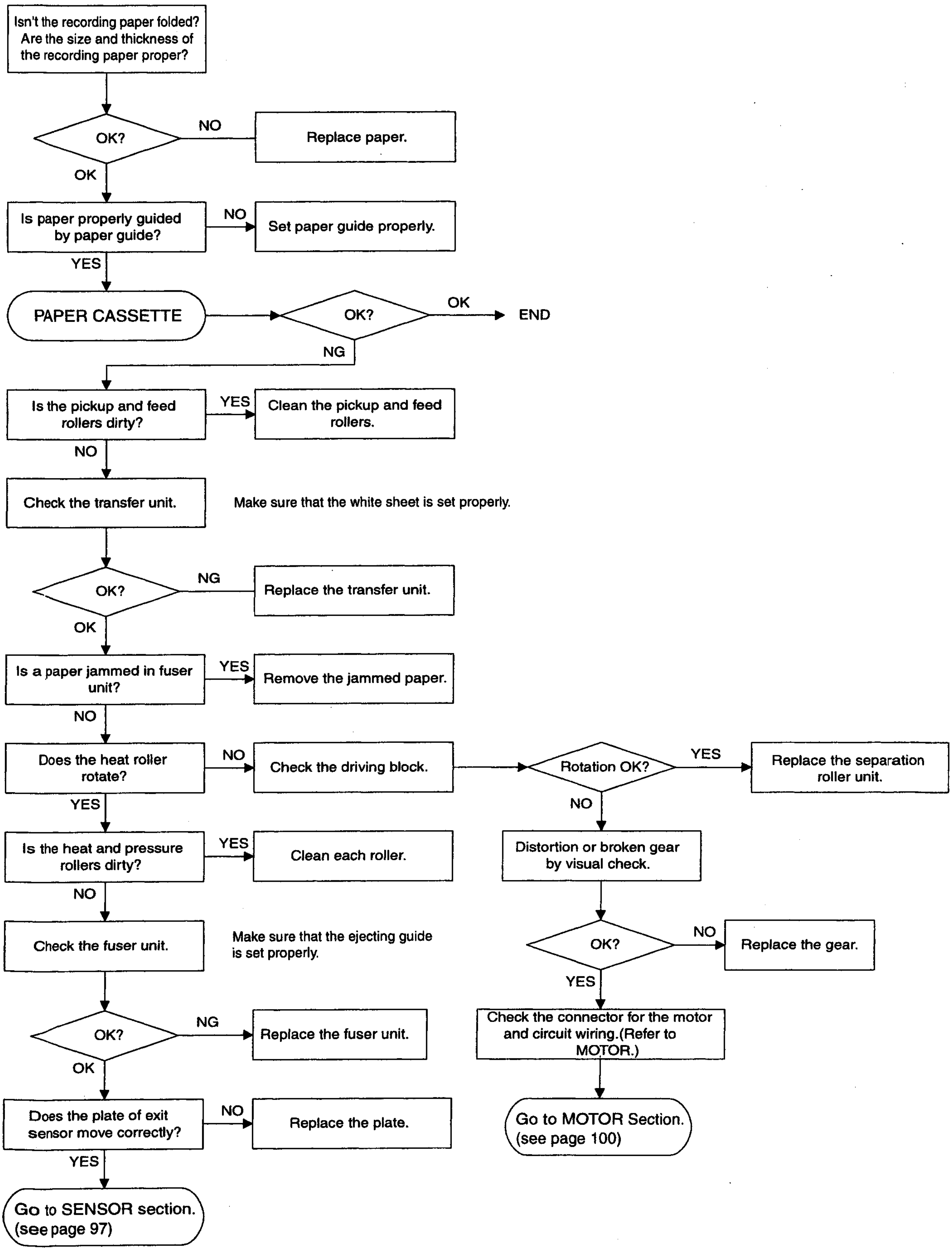
3.7-(3) Skew


Is Pick up roller Dirty?
OK?
NO
Clean or replace the Pick up roller.
YES
OK?
YES
END
NO
Is Regist roller Dirty?
OK?
NO
Clean or replace the Regist roller.
YES
OK?
YES
END
NO
PAPER CASSETTE
OK?
YES
END
NO
Is Regist roller Dirty?
OK?
NO
Clean or replace the Regist roller.
YES
OK?
YES
END
NO
Isn't paper jammed in its path?
OK?
NO
Remove the paper.
YES
OK?
YES
END
NO
Replace the LSU.
(Lasen Scan Unit)

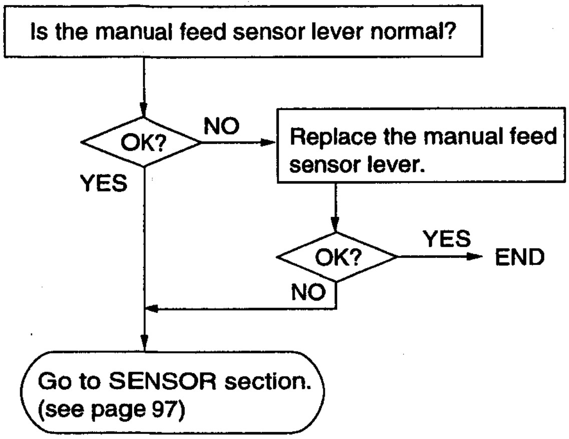
3.7-(4) The recording paper does not feed.


Check the pickup roller rotation.
OK?
NO
YES
Check the solenoid.
OK?
NO
YES
Repair the solenoid.
Is the pickup roller dirty?
Clean the pickup roller.
Check the resist roller rotation.
PAPER CASSETTE
YES
OK?
NO
OK?
OK
END
NG
Check the driving block.
Check the pickup sensor plate move.
Replace the plate.
Rotation OK?
YES
NO
Replace the separation roller unit.
Go to SENSOR Section. (see page 97)
Distortion or broken gear by visual check.
OK?
NO
YES
Replace the gear.
Check the connector for the motor and circuit wiring. (see page 100)
Go to MOTOR Section. (see page 100)

3.7-(5) Paper jam


Isn't the recording paper folded? Are the size and thickness of the recording paper proper?
OK?
NO
Replace paper.
OK
Is paper properly guided by paper guide?
NO
Set paper guide properly.
YES
PAPER CASSETTE
OK?
OK
END
NG
Is the pickup and feed rollers dirty?
YES
Clean the pickup and feed rollers.
NO
Check the transfer unit.
Make sure that the white sheet is set properly.
OK?
NG
Replace the transfer unit.
OK
Is a paper jammed in fuser unit?
YES
Remove the jammed paper.
NO
Does the heat roller rotate?
NO
Check the driving block.
Rotation OK?
YES
Replace the separation roller unit.
NO
Distortion or broken gear by visual check.
OK?
NO
Replace the gear.
YES
Check the connector for the motor and circuit wiring.(Refer to MOTOR.)
Go to MOTOR Section. (see page 100)
YES
Is the heat and pressure rollers dirty?
YES
Clean each roller.
NO
Check the fuser unit.
Make sure that the ejecting guide is set properly.
OK?
NG
Replace the fuser unit.
OK
Does the plate of exit sensor move correctly?
NO
Replace the plate.
YES
Go to SENSOR section. (see page 97)

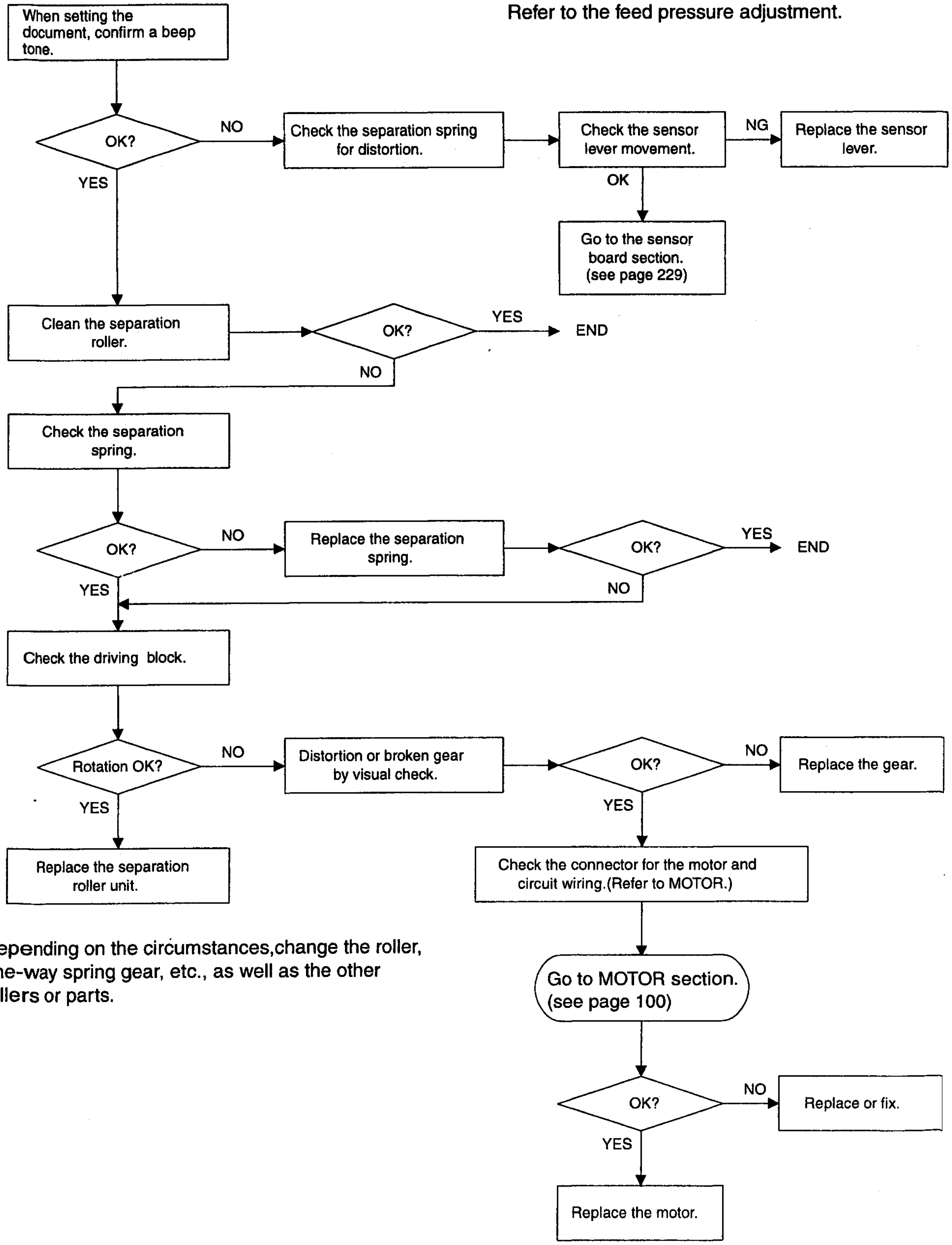
3.7-(6) The paper fed manually is not drawn in.


Is the manual feed sensor lever normal?
OK?
NO
YES
Replace the manual feed sensor lever.
OK?
YES
END
NO
Go to SENSOR section. (see page 97)

3.8 ADF(Auto document feed) section

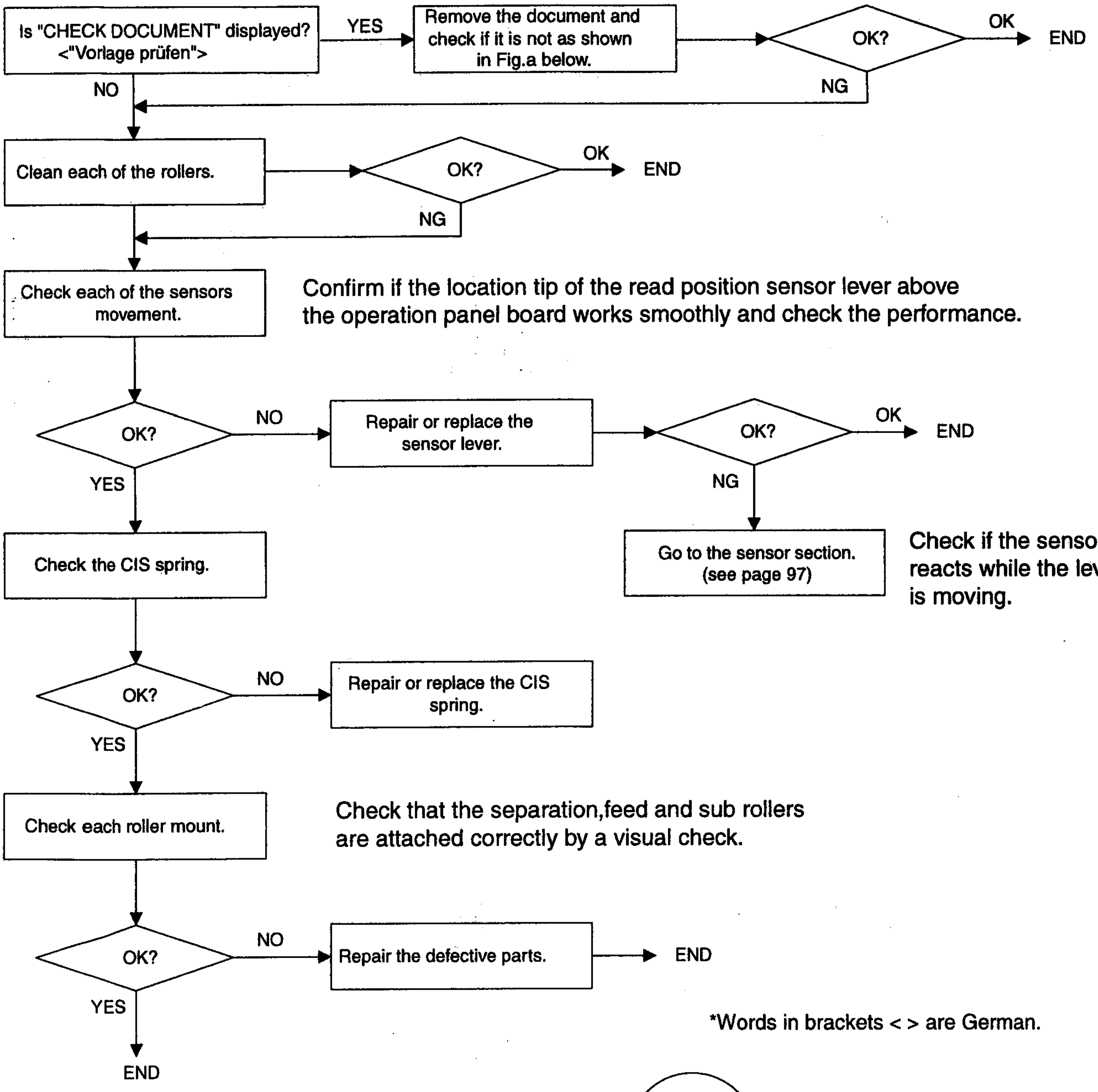
3.8-(1)No document feed

*When using thin paper etc., sometimes the document will not feed. Refer to the feed pressure adjustment.


When setting the document, confirm a beep tone.
OK?
NO
Check the separation spring for distortion.
Check the sensor lever movement.
NG
Replace the sensor lever.
OK
Go to the sensor board section. (see page 229)
YES
Clean the separation roller.
OK?
YES
END
NO
Check the separation spring.
OK?
NO
Replace the separation spring.
OK?
YES
END
NO
YES
Check the driving block.
Rotation OK?
NO
Distortion or broken gear by visual check.
OK?
NO
Replace the gear.
YES
YES
Replace the separation roller unit.
Check the connector for the motor and circuit wiring.(Refer to MOTOR.)
Go to MOTOR section. (see page 100)
OK?
NO
Replace or fix.
YES
Replace the motor.

Depending on the circumstances,change the roller, one-way spring gear, etc., as well as the other rollers or parts.

3.8-(2) Document JAM


Is "CHECK DOCUMENT" displayed?
<"Vorlage prüfen">
YES
Remove the document and check if it is not as shown in Fig.a below.
OK?
OK
END
NG
NO
Clean each of the rollers.
OK?
OK
END
NG
Check each of the sensors movement.
OK?
NO
Repair or replace the sensor lever.
OK?
OK
END
NG
Go to the sensor section. (see page 97)
YES
Check the CIS spring.
OK?
NO
Repair or replace the CIS spring.
YES
Check each roller mount.
OK?
NO
Repair the defective parts.
END
YES
END

Confirm if the location tip of the read position sensor lever above the operation panel board works smoothly and check the performance.

Check if the sensor reacts while the lever is moving.

Check that the separation,feed and sub rollers are attached correctly by a visual check.

*Words in brackets < > are German.

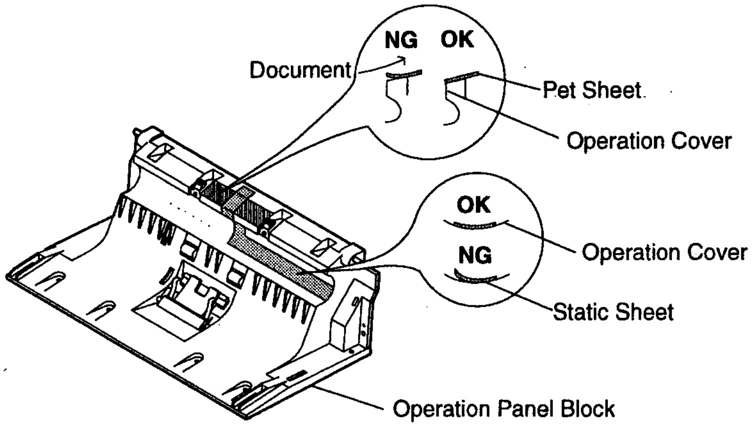
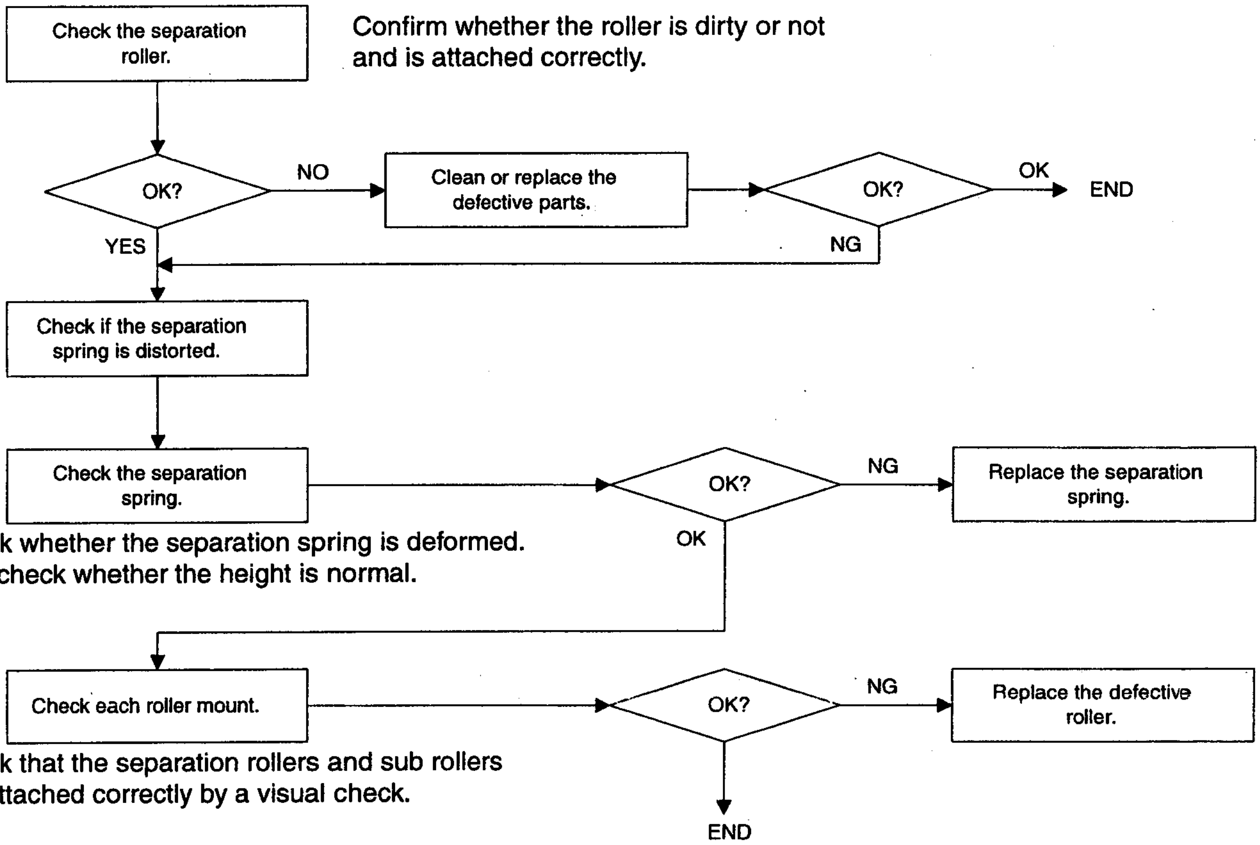

NG
OK
Document
Pet Sheet
Operation Cover
OK
NG
Operation Cover
Static Sheet
Operation Panel Block

Fig a

3.8-(3) Multiple feed

When using thick paper etc., sometimes the document will not feed.


Check the separation roller.
OK?
NO
YES
Clean or replace the defective parts.
OK?
OK
END
NG
Check if the separation spring is distorted.
Check the separation spring.
OK?
NG
OK
Replace the separation spring.
Check each roller mount.
OK?
NG
Replace the defective roller.
END

Confirm whether the roller is dirty or not and is attached correctly.

Check whether the separation spring is deformed. Also check whether the height is normal.

Check that the separation rollers and sub rollers are attached correctly by a visual check.

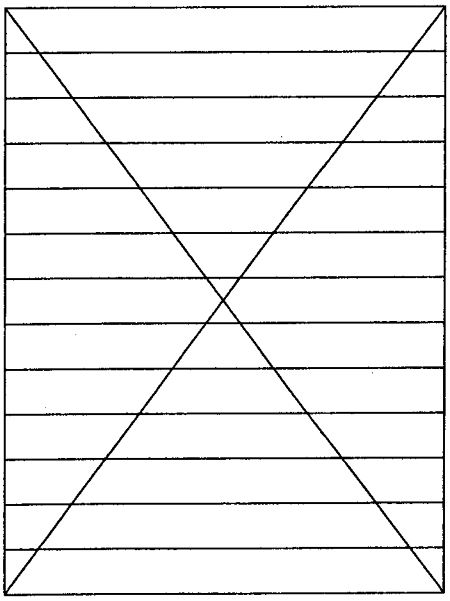
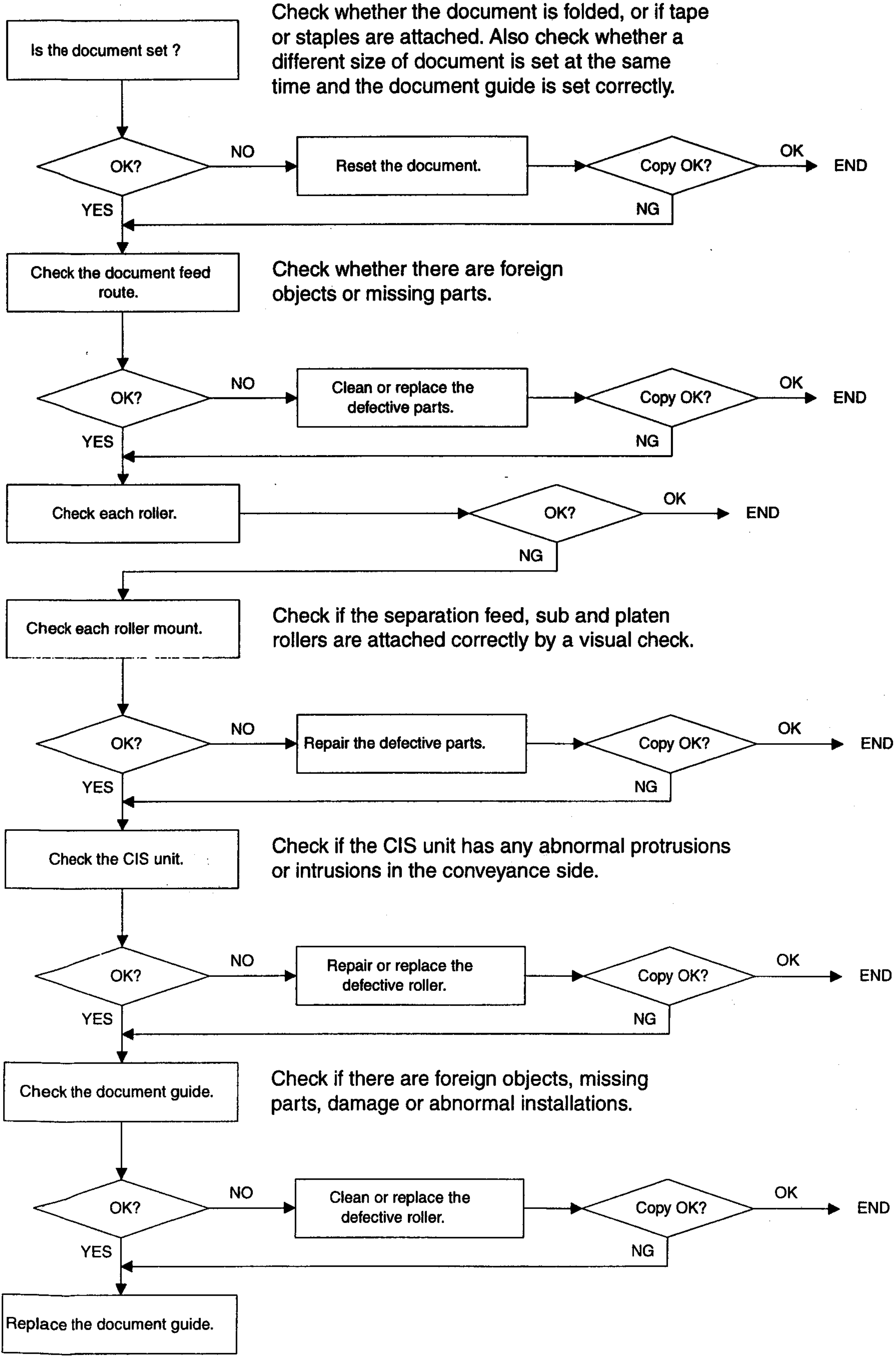


Fig b

When confirming if the characters are extended or distorted on,if the feed problem occurs,use this test chart. (Fig b)

3.8-(4) Skew


Is the document set ?
OK?
NO
Reset the document.
Copy OK?
OK
END
NG
YES
Check the document feed route.
OK?
NO
Clean or replace the defective parts.
Copy OK?
OK
END
NG
YES
Check each roller.
OK?
OK
END
NG
Check each roller mount.
OK?
NO
Repair the defective parts.
Copy OK?
OK
END
NG
YES
Check the CIS unit.
OK?
NO
Repair or replace the defective roller.
Copy OK?
OK
END
NG
YES
Check the document guide.
OK?
NO
Clean or replace the defective roller.
Copy OK?
OK
END
NG
YES
Replace the document guide.

Check whether the document is folded, or if tape or staples are attached. Also check whether a different size of document is set at the same time and the document guide is set correctly.

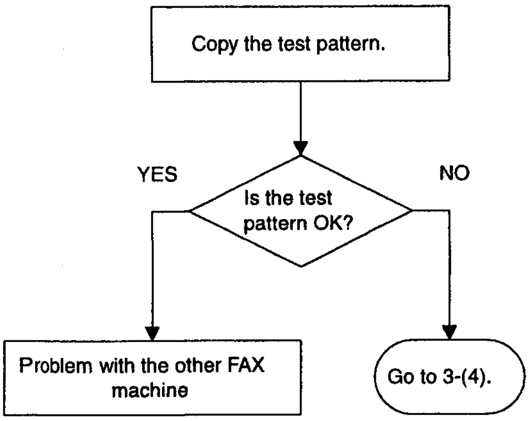
Check whether there are foreign objects or missing parts.

Check if the separation feed, sub and platen rollers are attached correctly by a visual check.

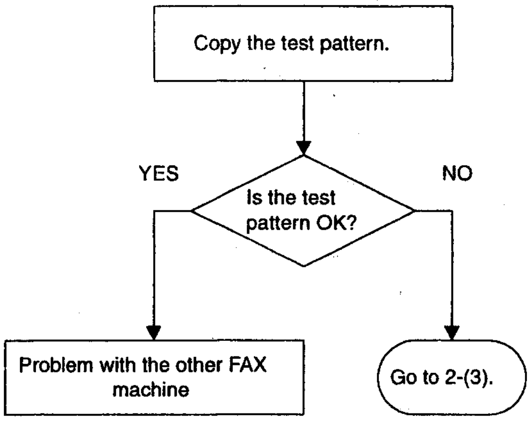
Check if the CIS unit has any abnormal protrusions or intrusions in the conveyance side.

Check if there are foreign objects, missing parts, damage or abnormal installations.

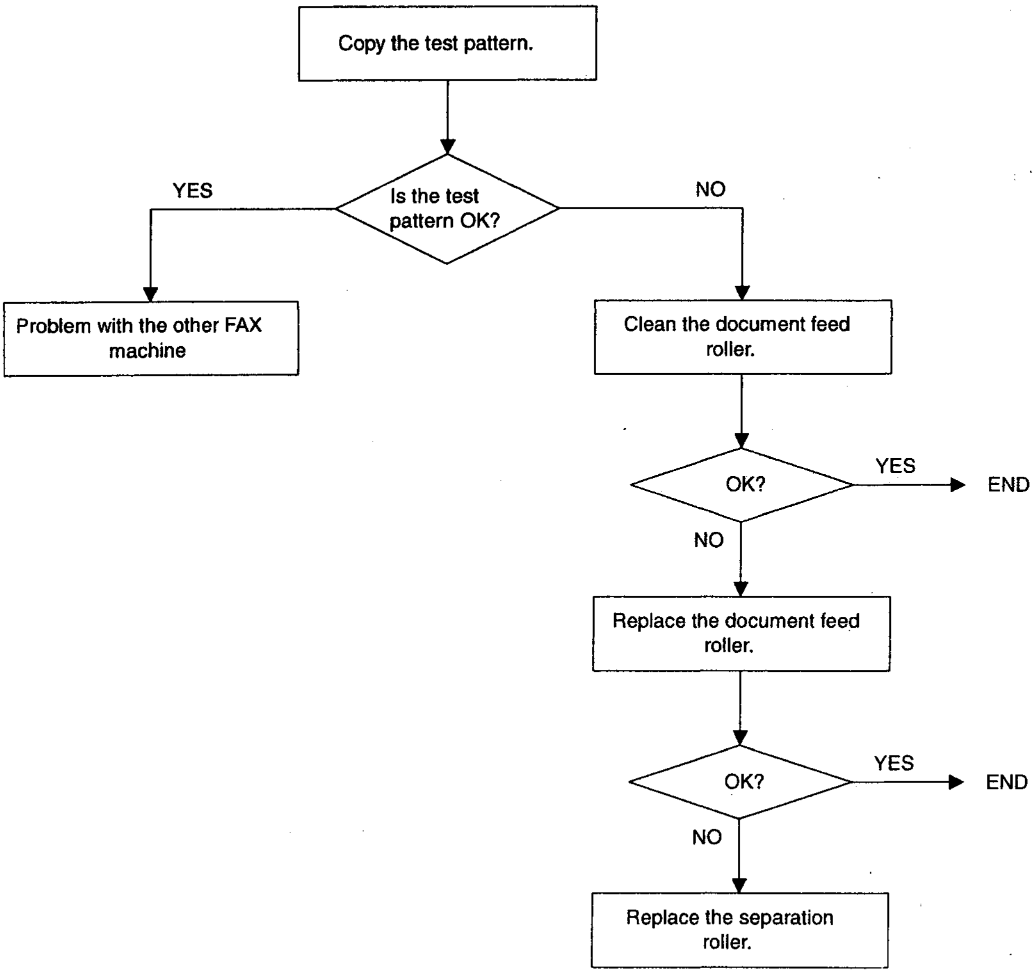
3.8-(5) The sent fax data is skewed.


Copy the test pattern.
Is the test pattern OK?
YES
NO
Problem with the other FAX machine
Go to 3-(4).

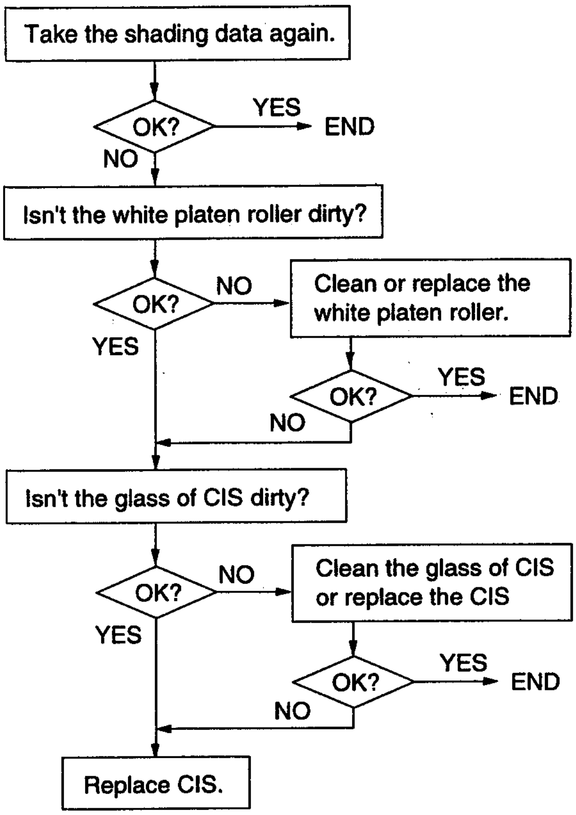
3.8-(6) The received fax data is skewed.


Copy the test pattern.
Is the test pattern OK?
YES
NO
Problem with the other FAX machine
Go to 2-(3).

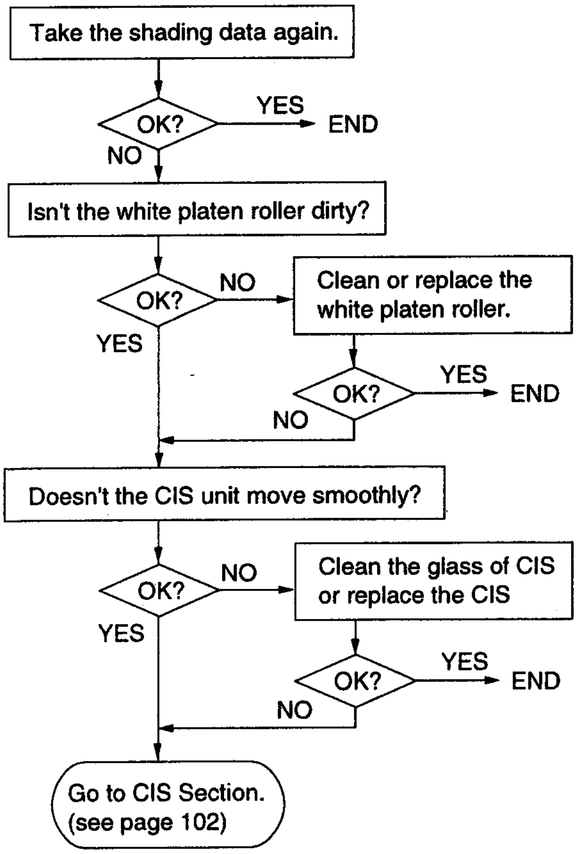
3.8-(7) The received or copied data is expanded.


Copy the test pattern.
Is the test pattern OK?
YES
NO
Problem with the other FAX machine
Clean the document feed roller.
OK?
YES
END
NO
Replace the document feed roller.
OK?
YES
END
NO
Replace the separation roller.

3.8-(8) Black or White Vertical Line


Take the shading data again.
OK?
YES
END
NO
Isn't the white platen roller dirty?
OK?
NO
Clean or replace the white platen roller.
YES
OK?
YES
END
NO
Isn't the glass of CIS dirty?
OK?
NO
Clean the glass of CIS or replace the CIS
YES
OK?
YES
END
NO
Replace CIS.

3.8-(9) An abnormal image is copied.


Take the shading data again.
OK?
YES
END
NO
Isn't the white platen roller dirty?
OK?
NO
Clean or replace the white platen roller.
YES
OK?
YES
END
NO
Doesn't the CIS unit move smoothly?
OK?
NO
Clean the glass of CIS or replace the CIS
YES
OK?
YES
END
NO
Go to CIS Section. (see page 102)

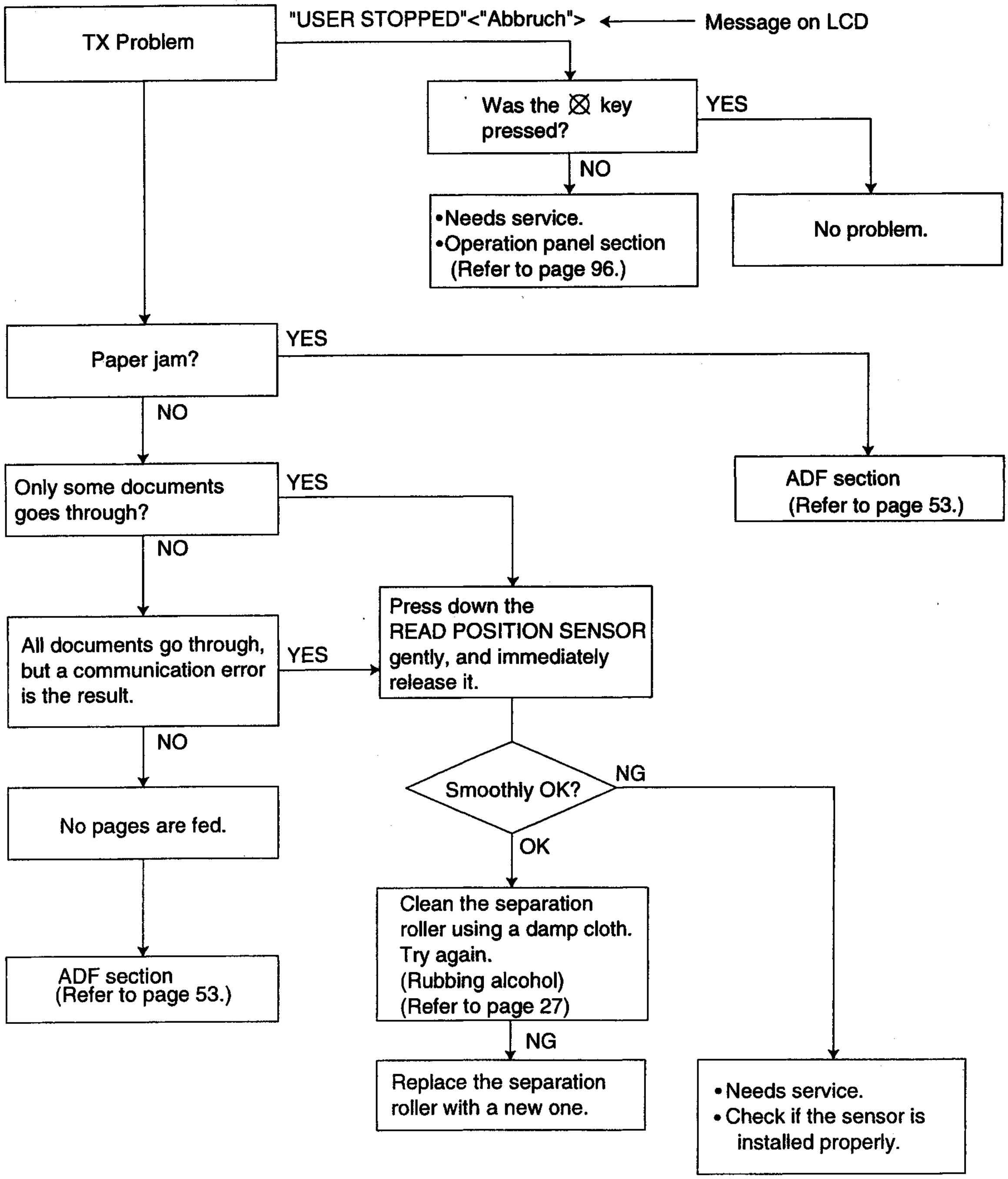
3.3.3 Communication Section

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in the reference pages (P60 - P76).

No.	Symptom	Ref. page	Content	Possible cause
1	The paper does not feed properly when faxing. (Copying is also not possible.)	p. 60	Troubleshooting	Problem with the feeding mechanism.
2	The fax transmits successfully one time and fails another. (Copying is also possible.)	p. 61	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax receives successfully one time and fails another. (Copying is also possible.)	p. 62	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (Copying is also possible.)	p. 64	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or international call. (Copying is also possible.)	p. 65 ~ p. 67	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or international call.	p. 67		
7	No.1-No.5	p. 68 ~ p. 76	The troubleshooting procedure for each error code will be printed on the communication result report.	

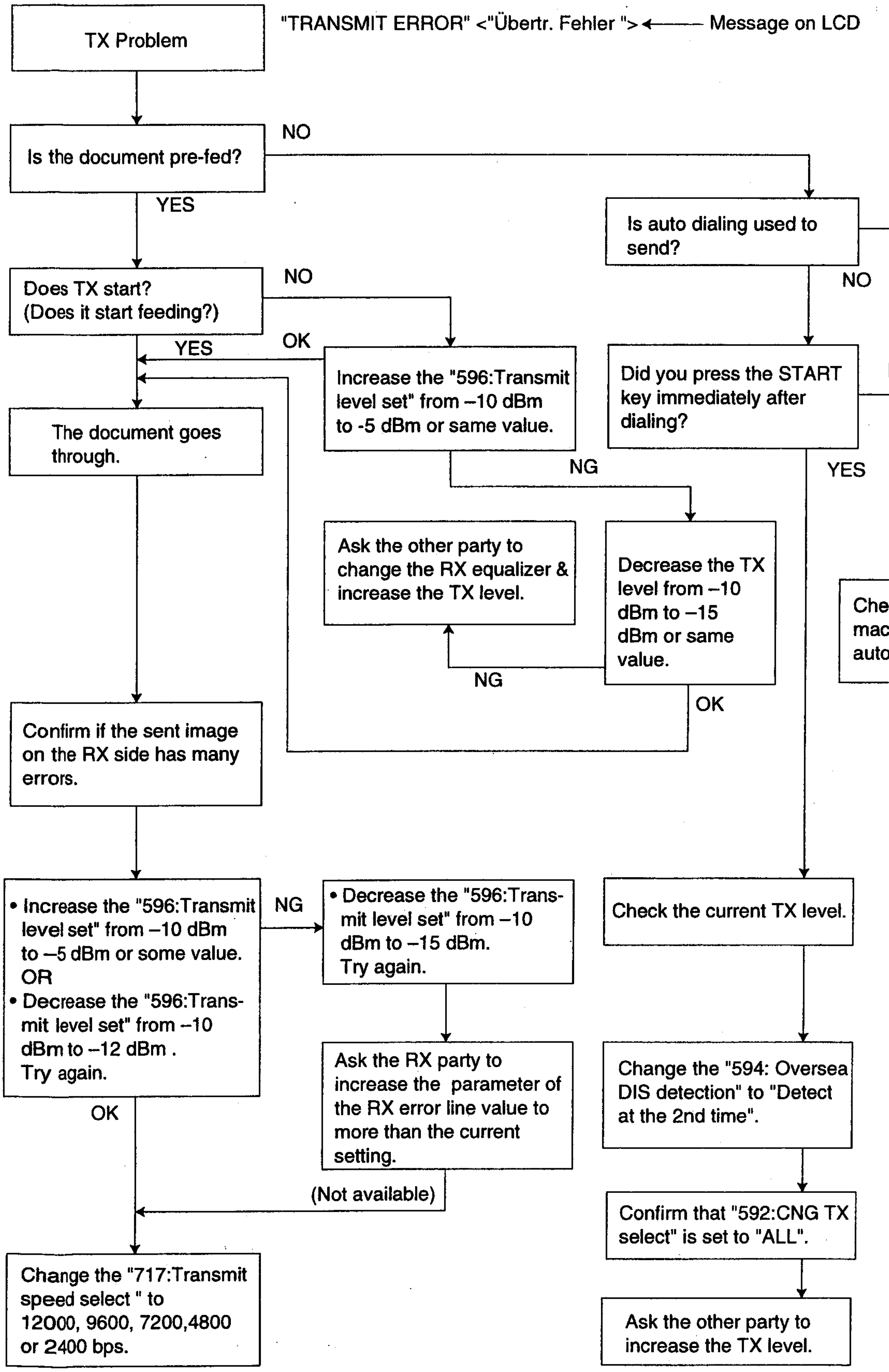
1) Defective facsimile section

① Transmit problem


TX Problem
"USER STOPPED"<"Abbruch">
Message on LCD
Was the ⊠ key pressed?
YES
NO
•Needs service.
•Operation panel section (Refer to page 96.)
No problem.
Paper jam?
YES
NO
ADF section (Refer to page 53.)
Only some documents goes through?
YES
NO
Press down the READ POSITION SENSOR gently, and immediately release it.
All documents go through, but a communication error is the result.
YES
NO
Smoothly OK?
NG
OK
No pages are fed.
Clean the separation roller using a damp cloth. Try again. (Rubbing alcohol) (Refer to page 27)
ADF section (Refer to page 53.)
NG
Replace the separation roller with a new one.
• Needs service.
• Check if the sensor is installed properly.

*Words in brackets < > are German.

② Sometimes there is a transmit problem.


TX Problem
"TRANSMIT ERROR" <"Übertr. Fehler"> ← Message on LCD
Is the document pre-fed?
NO
YES
Is auto dialing used to send?
YES
NO
Does TX start? (Does it start feeding?)
NO
YES
OK
Increase the "596:Transmit level set" from –10 dBm to -5 dBm or same value.
Did you press the START key immediately after dialing?
NO
YES
The document goes through.
NG
Ask the other party to change the RX equalizer & increase the TX level.
Decrease the TX level from –10 dBm to –15 dBm or same value.
Check the other party's machine. (Out of paper, auto answer off, etc.)
NG
OK
Confirm if the sent image on the RX side has many errors.
• Increase the "596:Transmit level set" from –10 dBm to –5 dBm or some value.
OR
• Decrease the "596:Transmit level set" from –10 dBm to –12 dBm.
Try again.
NG
• Decrease the "596:Transmit level set" from –10 dBm to –15 dBm.
Try again.
Check the current TX level.
OK
Ask the RX party to increase the parameter of the RX error line value to more than the current setting.
Change the "594: Oversea DIS detection" to "Detect at the 2nd time".
(Not available)
Confirm that "592:CNG TX select" is set to "ALL".
Change the "717:Transmit speed select" to 12000, 9600, 7200, 4800 or 2400 bps.
Ask the other party to increase the TX level.

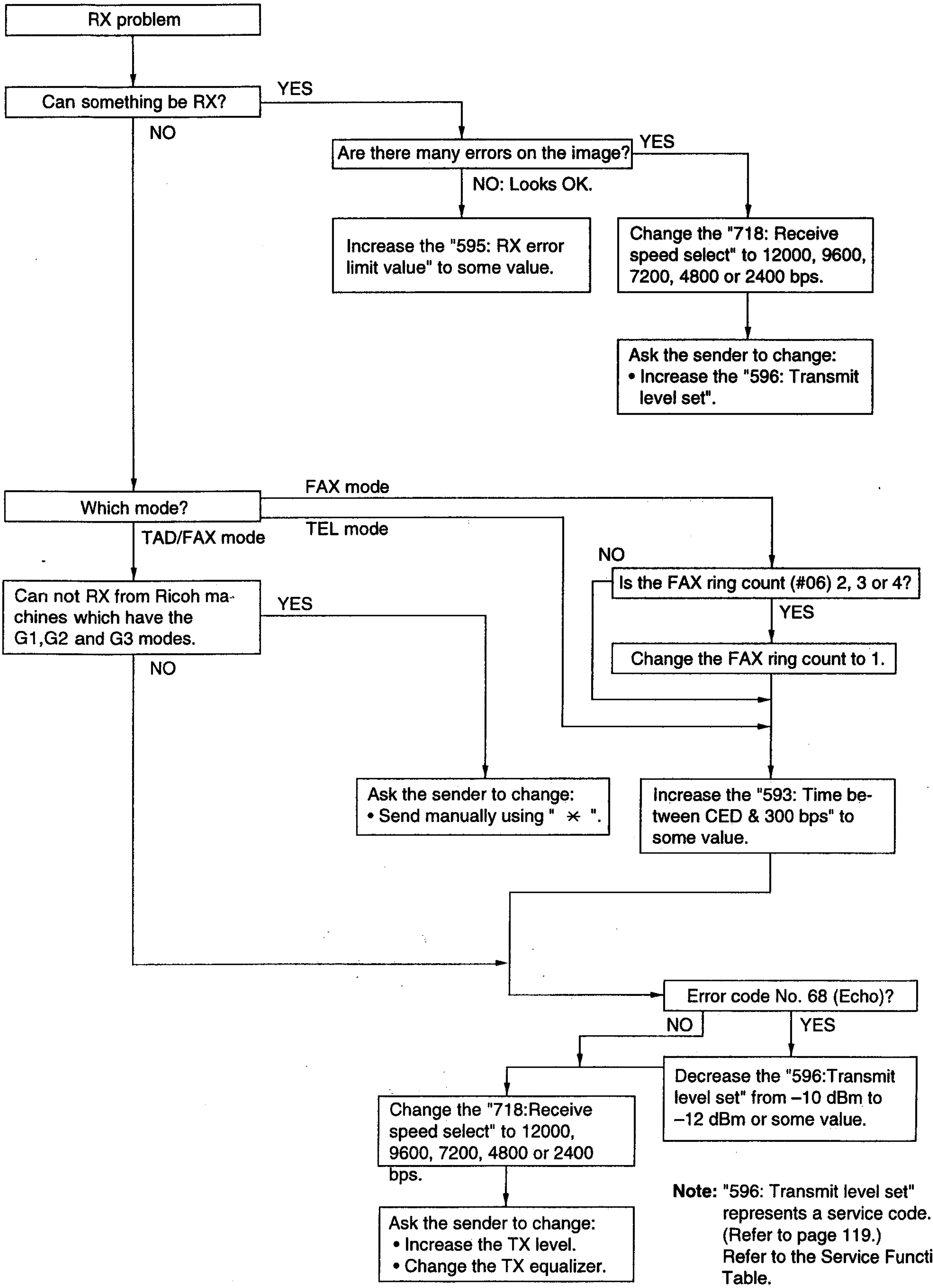
Note: "596: Transmit level set" represents a service code. (Refer to page 119.) Refer to the Service Function Table.

*Words in brackets < > are German.

③ Receive problem

Confirm the following before starting troubleshooting.

- Is the recording paper installed properly? Refer to the next page.


RX problem
Can something be RX?
YES
NO
Are there many errors on the image?
YES
NO: Looks OK.
Increase the "595: RX error limit value" to some value.
Change the "718: Receive speed select" to 12000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the "596: Transmit level set".
Which mode?
FAX mode
TEL mode
TAD/FAX mode
NO
Is the FAX ring count (#06) 2, 3 or 4?
YES
Change the FAX ring count to 1.
Can not RX from Ricoh machines which have the G1,G2 and G3 modes.
YES
NO
Ask the sender to change:
• Send manually using " * ".
Increase the "593: Time between CED & 300 bps" to some value.
Error code No. 68 (Echo)?
NO
YES
Decrease the "596:Transmit level set" from –10 dBm to –12 dBm or some value.
Change the "718:Receive speed select" to 12000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the TX level.
• Change the TX equalizer.

Note: "596: Transmit level set" represents a service code. (Refer to page 119.)
Refer to the Service Function Table.

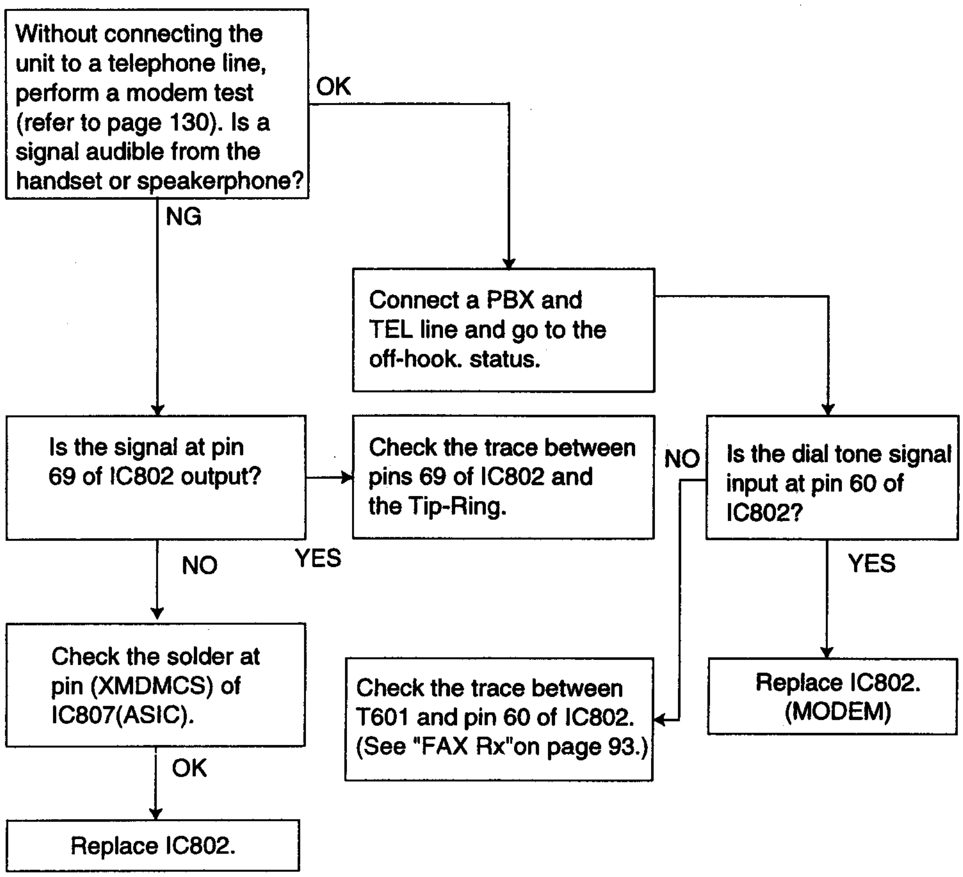
For the receiving problem, we have thought of causes other than in the software. Some causes may be when the fax changes to the memory receiving mode (for example, when out of paper), and the memory becomes full of the unprinted fax data. In this case, [MEMORY FULL] <Speicher voll> and its main cause (for example, "OUT OF PAPER" <"Papier alle">) are displayed on the LCD.
Accordingly, by solving the main problem, [SMEMORY FULL] <Speicher voll> can be canceled and the receiving problem can be solved. The causes of the display errors are shown below.

OUT OF PAPER <Papier alle>
CHECK TONER <Prüfe Toner>
TONER EMPTY <Toner alle>
CALL SERVICE <Service notw>
CHANGE DRUM <Trommel wechsel>
TOP COVER OPEN <Deckel offen>
FAILED PICK UP <Fehleinzug>
PAPER JAMMED <Papierstau>
CHECK DRUM <Prüfe Trommel>
MEMORY FULL <Speicher voll>

Please refer to "2. User Recoverable Errors" (Refer to page 30) for the above items.
Also, when it actually becomes a hardware deformity, please check each sensor. (Refer to page 131.)

*Words in brackets < >are German.

④ The unit can copy, but cannot transmit/receive.

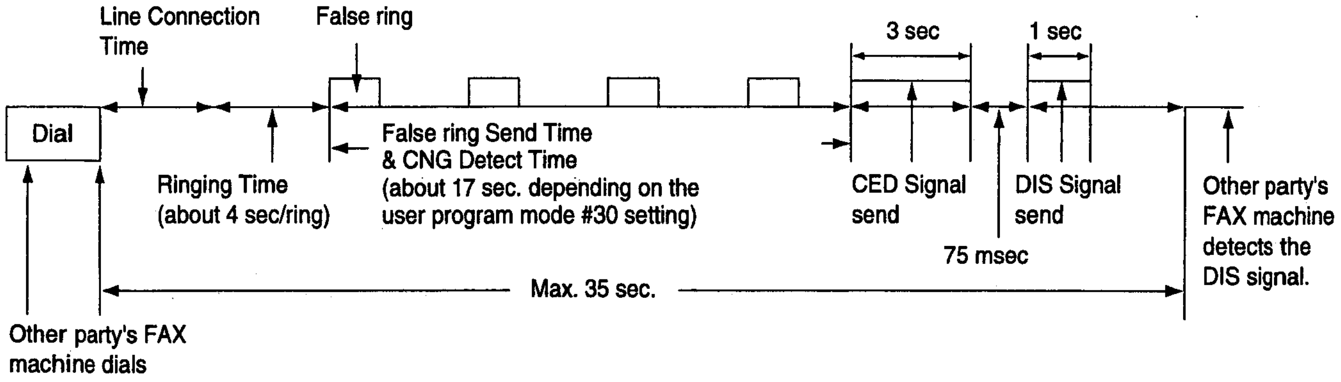

Without connecting the unit to a telephone line, perform a modem test (refer to page 130). Is a signal audible from the handset or speakerphone?
OK
NG
Connect a PBX and TEL line and go to the off-hook. status.
Is the signal at pin 69 of IC802 output?
Check the trace between pins 69 of IC802 and the Tip-Ring.
NO
Is the dial tone signal input at pin 60 of IC802?
NO
YES
YES
Check the solder at pin (XMDMCS) of IC807(ASIC).
Check the trace between T601 and pin 60 of IC802. (See "FAX Rx"on page 93.)
Replace IC802. (MODEM)
OK
Replace IC802.

⑤ The unit can copy, but cannot either transmit/receive long distance or international communications.

The following 2 causes can be considered for this.

Cause 1:
The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the other party releases the line.)

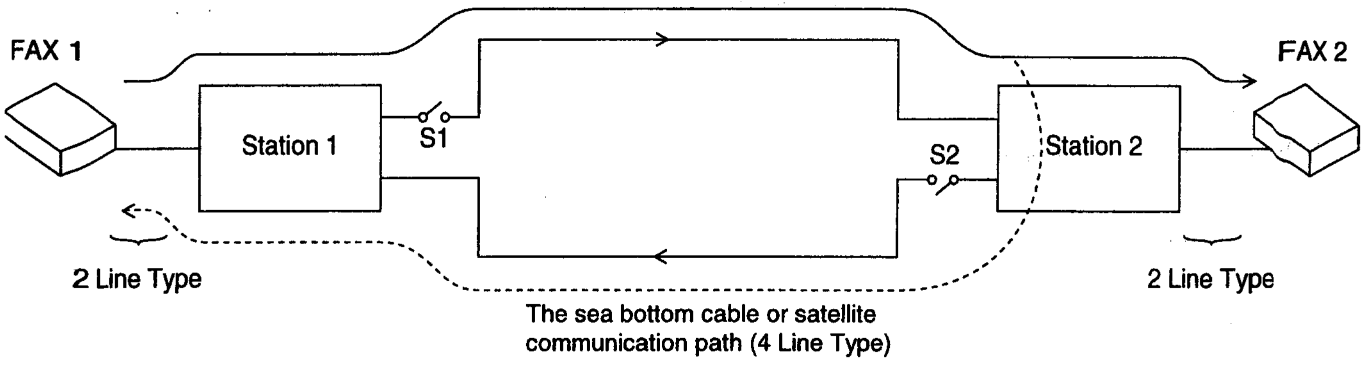
(Response Time)


Line Connection Time
False ring
3 sec
1 sec
Dial
Ringing Time (about 4 sec/ring)
False ring Send Time & CNG Detect Time (about 17 sec. depending on the user program mode #30 setting)
CED Signal send
DIS Signal send
75 msec
Other party's FAX machine detects the DIS signal.
Max. 35 sec.
Other party's FAX machine dials

(Cause and Countermeasure)
As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.

(A) As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible.
Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:
Erroneous detection because of an echo or an echo canceler.


FAX 1
FAX 2
Station 1
Station 2
S1
S2
2 Line Type
2 Line Type
The sea bottom cable or satellite communication path (4 Line Type)

(Echo/Echo Canceler)
The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX 1.

(Causes and Countermeasures)

(Cause A)

When a training signal is transmitted from FAX1 during the communication procedure at the time of transmission from FAX1 to FAX2, there is a delay until the echo canceler operates. S1 is closed so that a part of the head of the training signal may drop out. Normal reception by FAX2 may not be possible, and transmission may not be started.

(Countermeasure A)

When the international line mode is ON in the service mode (code No. 521), a dummy signal is attached to the head of the training signal to prevent this problem. As this normally is ON, it is necessary to reconfirm that this has not become OFF. When the international mode is switched OFF, the transmission side will try the training signal three times at each speed (9600BPS, 4800BPS and 2400BPS). If NG, it will drop the speed by one rank (fall-back). When the international mode is switched ON, each speed will be tried only twice. In other words, the slower speed with fewer errors can be accessed more easily. This is done because the line conditions may deteriorate and the picture may be disturbed more easily during communication for international lines or long distance communication, even when the training is OK. The default value is ON as preference is given to clearer pictures rather than speed.

(Cause B)

The echo canceler operation is stopped with a 2100Hz signal. (i.e. S1 and S2 become ON).

Accordingly, when FAX1 has executed automatic reception, a CED signal is output. If this signal is 2100Hz, S1 and S2 will become ON. Then the echo of the DIS signal output afterwards may be received and FAX1 may execute an erroneous operation, preventing communication from starting.

(Countermeasure B)

In the service mode, the CED signal frequency is set to 1100 Hz (code No.520), or the time setting between the CED signal and the DIS signal is set from 75 msec to 500 msec in the service mode (code No.593). This is because the echo canceler operation stop mode is canceled by an interval of 250 msec or more.

(Cause C)

This model is FAX1 and the other party is FAX2.

For transmission from this model to FAX2, FAX2 executes automatic reception and transmits a CED signal (2100 Hz) followed by a DIS signal. As the echo cancelers stops as described in cause B, the echo of the DIS signal returns to FAX2. On the other hand, this model detects the DIS signal and transmits a DCS signal. In other words, it is possible that the echo of the DIS signal and the DCS signal transmitted from this model reach FAX2 one after the other. FAX2 defect an error and communication is not started.

Reduce receiving sensitivity to reduce the effect of RCV echo signal.(code No.598)

(Countermeasure C)

When the international DIS detection setting is set in the service mode (code No.594), this model does not respond to the first DIS signal and returns a DCS signal only for the second DIS signal.

In other words, there is an interval of 250 msec between transmission of the first and second DIS signal so that the echo cancelers operation recovers. An echo is not generated for the second DIS signal.

Note:

When the other FAX does not respond with a DCS signal after DIS signal transmission, the DIS signal is transmitted three times for trial.

Summary:
Long distance and international communication operations

SYMPTOM	COUNTERMEASURE
Does not receive in the automatic mode.	1. If possible, manual transmission should be done from the transmission side. 2. If possible, two pauses should be inserted at the end of the auto dial number on the transmission side. 3. If possible, the Function Selector Switch should be switched to FAX.
Does not transmit.	1. Confirm the international line mode is ON. (Service mode: code No. 521) 2. Enable the international DIS detection setting. (Service mode: code No. 594)
Does not receive.	1. Set the time setting between the CED signal and the DIS signal to 500 msec. (Service mode: code No. 593) 2. Set the CED frequency to 1100Hz. (Service mode: code No. 520) 3. Reduce the RCV sensitivity (service mode: codeNo.598)

⑥The unit can copy, but the transmission and reception image are incorrect.
(Long distance or international communication operation)

This widely depends on the transmission and reception capability of the other FAX unit and the line conditions. The countermeasures for this unit are shown below.

Transmission Operation:
Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:
If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

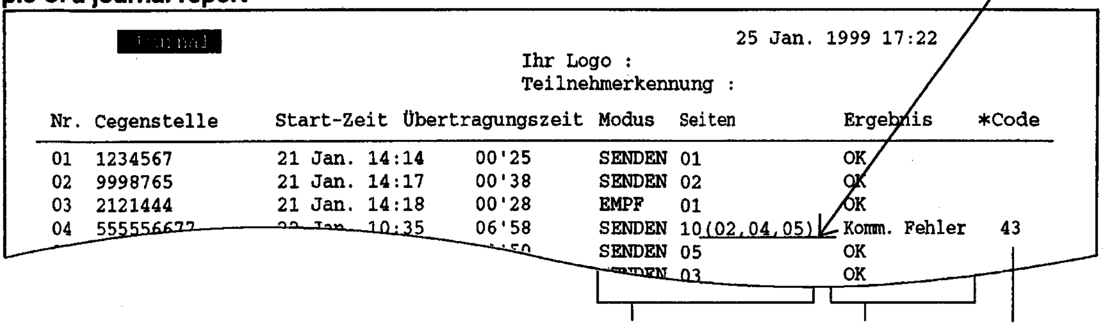
- Refer to page 117 for the service mode's code setting.

⑦ How to output the Journal Report:

1. Press the MENÜ button.
2. Press "#", then "8" and "4".
3. Press the START/SET/COPY (START/⊖/KOPIE) button.
4. The report prints out.

Sample of a journal report

*Words in brackets ( ) are German.



```
Journal                                       25 Jan. 1999 17:22
                                  Ihr Logo :
                                  Teilnehmerkennung :

Nr. Cegenstelle     Start-Zeit Übertragungszeit Modus  Seiten          Ergebnis      *Code
01  1234567         21 Jan. 14:14     00'25     SENDEN 01              OK
02  9998765         21 Jan. 14:17     00'38     SENDEN 02              OK
03  2121444         21 Jan. 14:18     00'28     EMPF   01              OK
04  555556677       22 Jan. 10:35     06'58     SENDEN 10(02,04,05)    Komm. Fehler   43
                                                SENDEN 05              OK
                                                SENDEN 03              OK
```

This number indicates the page which received RTN signal in sending.The sending page including Error lines.

(3) TX(SENDEN): Sent directly
RX(EMPF): Received directly

(2) Communication message

(1) Error code

⑧ Error code table

RCV:Received directly

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Counter-measure (go to the next page)
	PRESSED THE STOP KEY	TX & RX	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	TX	The document paper is jammed.	
	NO DOCUMENT	TX	No document paper.	
	THE COVER WAS OPENED	TX & RX	The cover is open.	
40	NO RESPONSE	TX	Transmission is finished when the T1 TIMER expires.	1
41	COMMUNICATION ERROR	TX	DCN is received after DCS transmission.	2
42	COMMUNICATION ERROR	TX	FTT is received after transmission of a 2400BSP training signal.	3
43	COMMUNICATION ERROR	TX	No response after post message is transmitted three times.	4
44	COMMUNICATION ERROR	TX	RTN and PIN are received.	5
46	COMMUNICATION ERROR	RX	No response after FTT is transmitted.	6
48	COMMUNICATION ERROR	RX	No post message.	7
49	COMMUNICATION ERROR	RX	RTN is transmitted.	8
50	COMMUNICATION ERROR	RX	PIN is transmitted (to PRI-Q).	8
51	COMMUNICATION ERROR	RX	PIN is transmitted.	8
52	NO RESPONSE	RX	Reception is finished when the T1 TIMER expires.	9
54	ERROR-NOT YOUR UNIT	RX	DCN is received after DIS transmission.	11
58	COMMUNICATION ERROR	RX	DCN is received after FTT transmission.	13
59	ERROR-NOT YOUR UNIT	TX	DCN responds to the post message.	14
65	COMMUNICATION ERROR	TX	DCN is received before DIS reception.	2
65	COMMUNICATION ERROR	RX	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	2
68	COMMUNICATION ERROR	RX	No response at the other party after MCF or CFR is transmitted.	13
70	ERROR-NOT YOUR UNIT	RX	DCN is received after CFR transmission.	13
72	COMMUNICATION ERROR	RX	Carrier is cut when the image signal is received.	16
75	MEMORY FULL	RX	The document was not received due to memory full.	
79	CANCELED	TX	The multistation transmission was rejected by the user.	
FF	COMMUNICATION ERROR	TX & RX	Modem error. For the DCN, DCS, etc. abbreviations, refer to "5. Modem Section" on page 193.	12

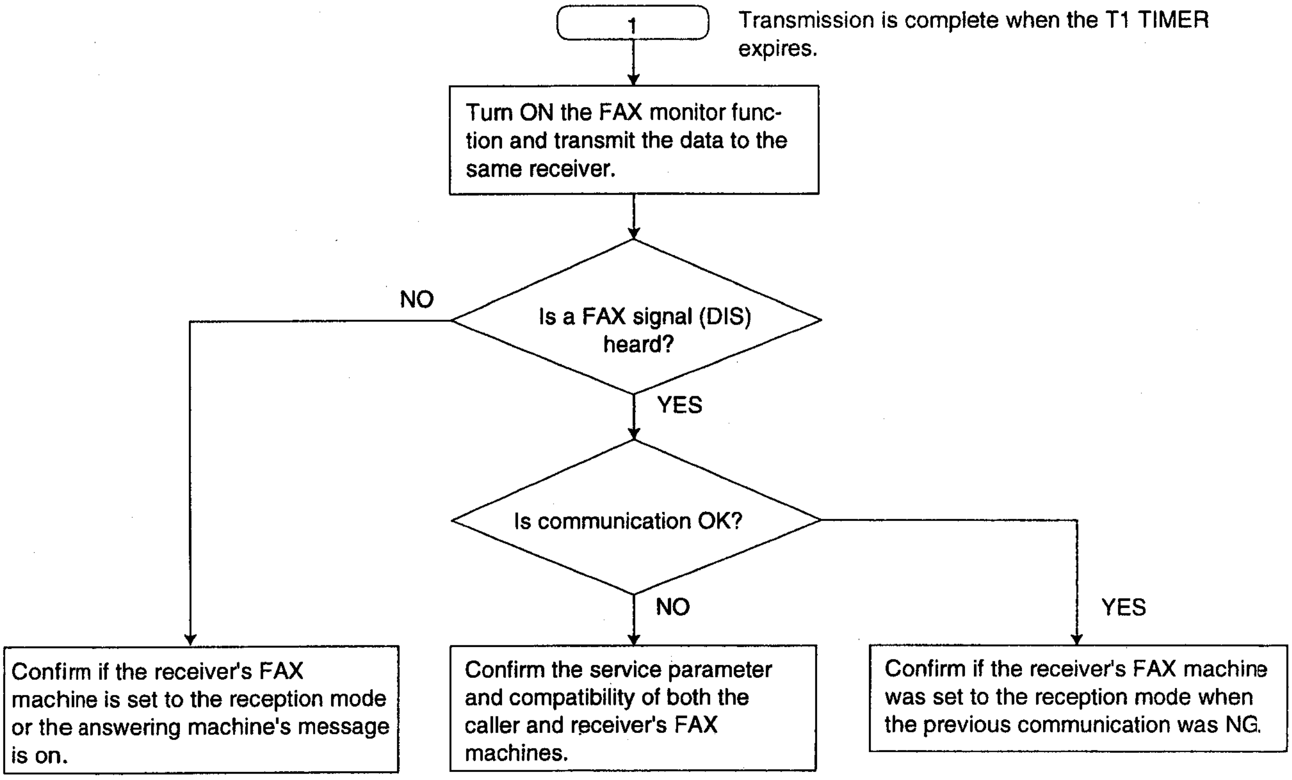
TX=TRANSMISSION RX=RECEPTION

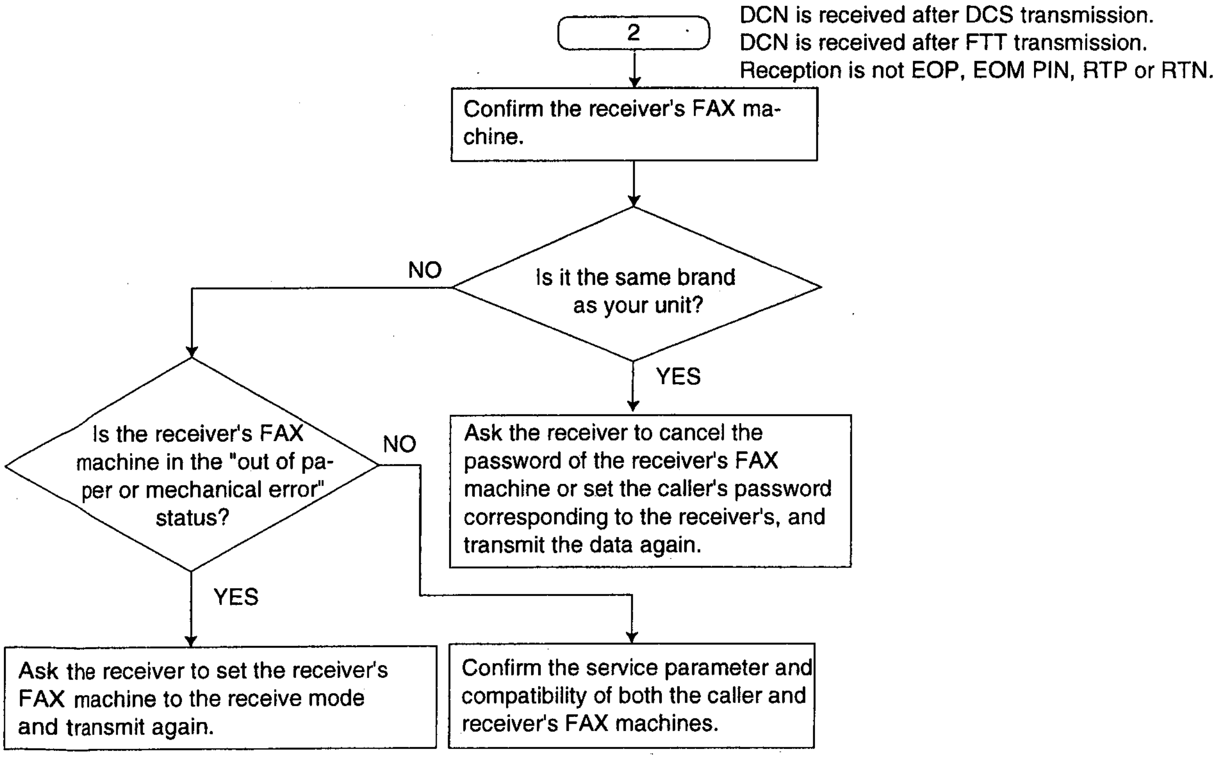
※Most fax communication problems can be resolved by the following steps.

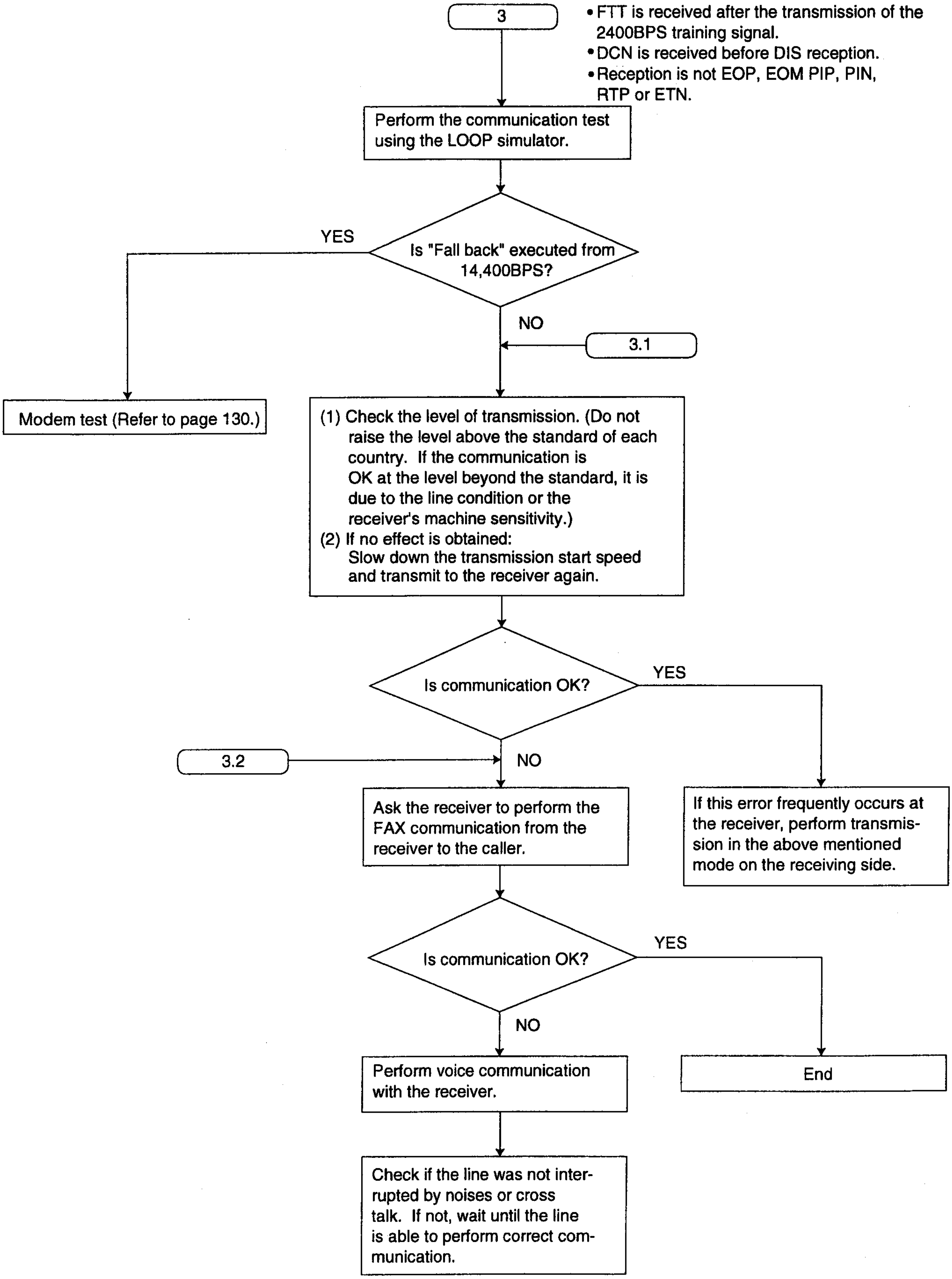
1) Change the transmit level. (Service code: 596, refer to page 119.)
2) Change the TX speed/RX speed. (Service code: 717/718, refer to page 119,120.)

If the problem remains , see the next page.

⑨ Countermeasure

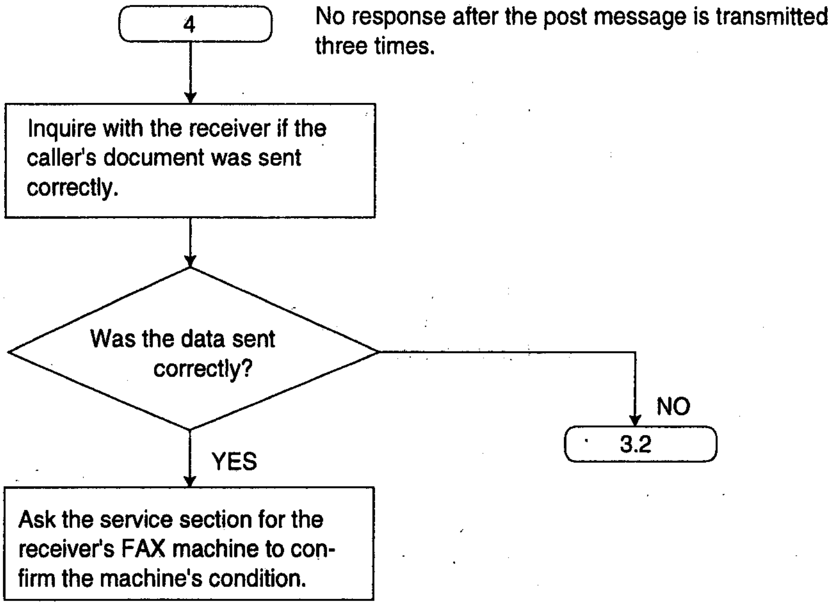

1
Transmission is complete when the T1 TIMER expires.
Turn ON the FAX monitor function and transmit the data to the same receiver.
Is a FAX signal (DIS) heard?
NO
YES
Is communication OK?
NO
YES
Confirm if the receiver's FAX machine is set to the reception mode or the answering machine's message is on.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.
Confirm if the receiver's FAX machine was set to the reception mode when the previous communication was NG.

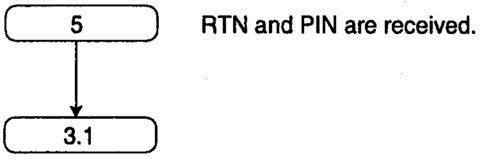

2
DCN is received after DCS transmission.
DCN is received after FTT transmission.
Reception is not EOP, EOM PIN, RTP or RTN.
Confirm the receiver's FAX machine.
Is it the same brand as your unit?
NO
YES
Ask the receiver to cancel the password of the receiver's FAX machine or set the caller's password corresponding to the receiver's, and transmit the data again.
Is the receiver's FAX machine in the "out of paper or mechanical error" status?
NO
YES
Ask the receiver to set the receiver's FAX machine to the receive mode and transmit again.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.

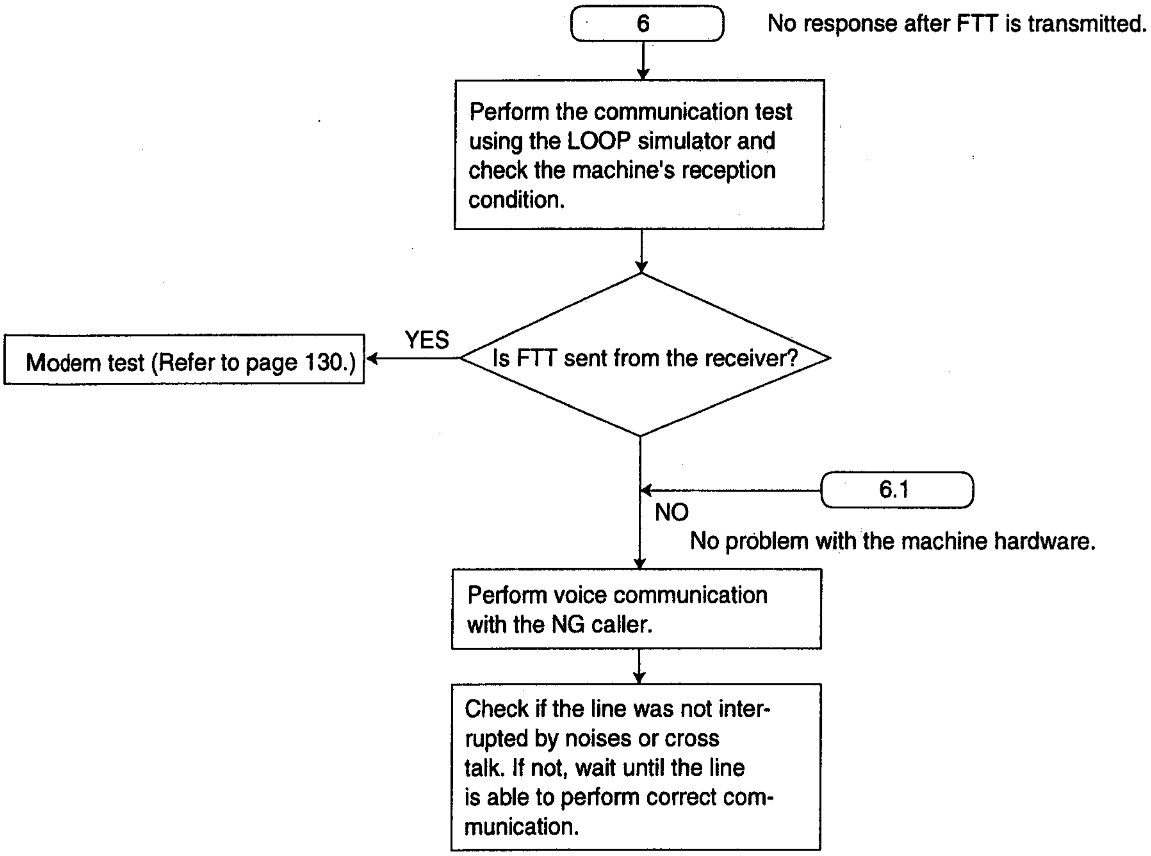


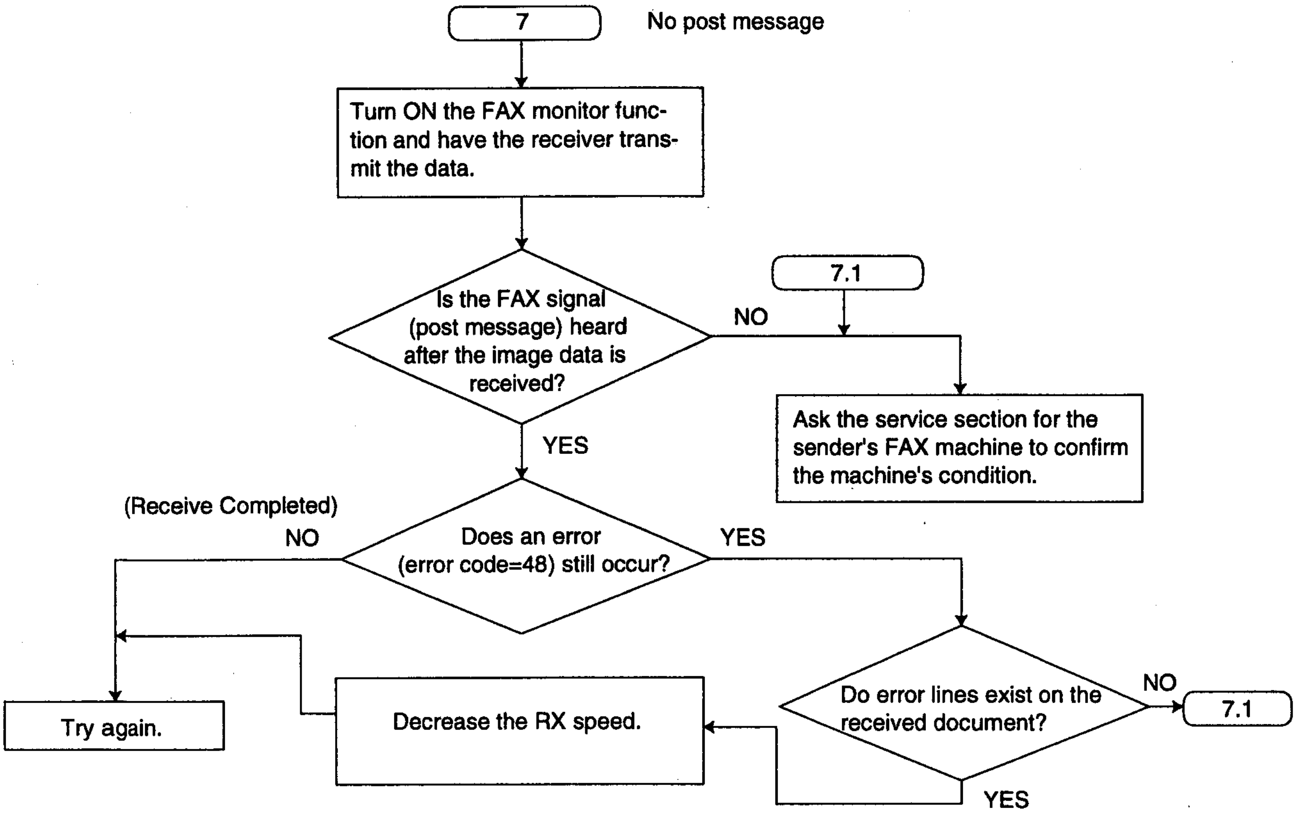
- FTT is received after the transmission of the 2400BPS training signal.
- DCN is received before DIS reception.
- Reception is not EOP, EOM PIP, PIN, RTP or ETN.

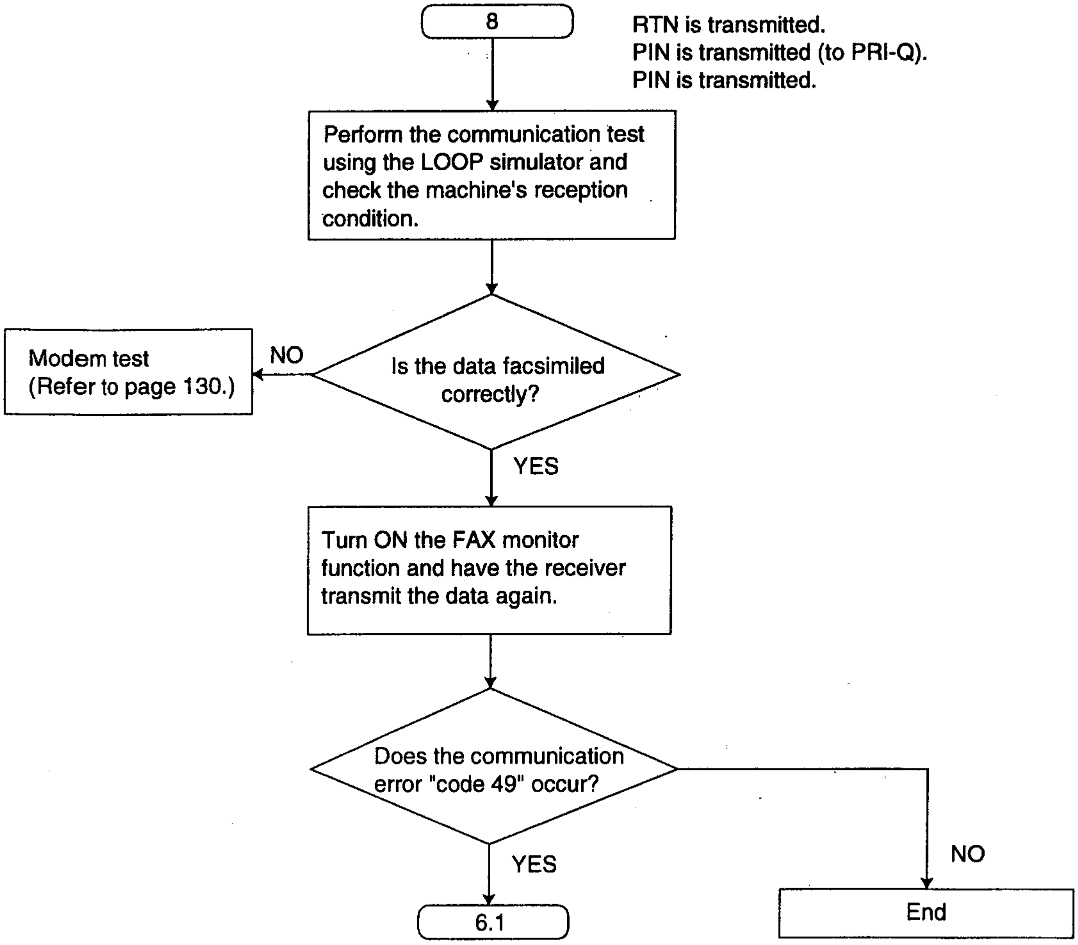
3
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 14,400BPS?
YES
NO
Modem test (Refer to page 130.)
3.1
(1) Check the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
(2) If no effect is obtained: Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
NO
3.2
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

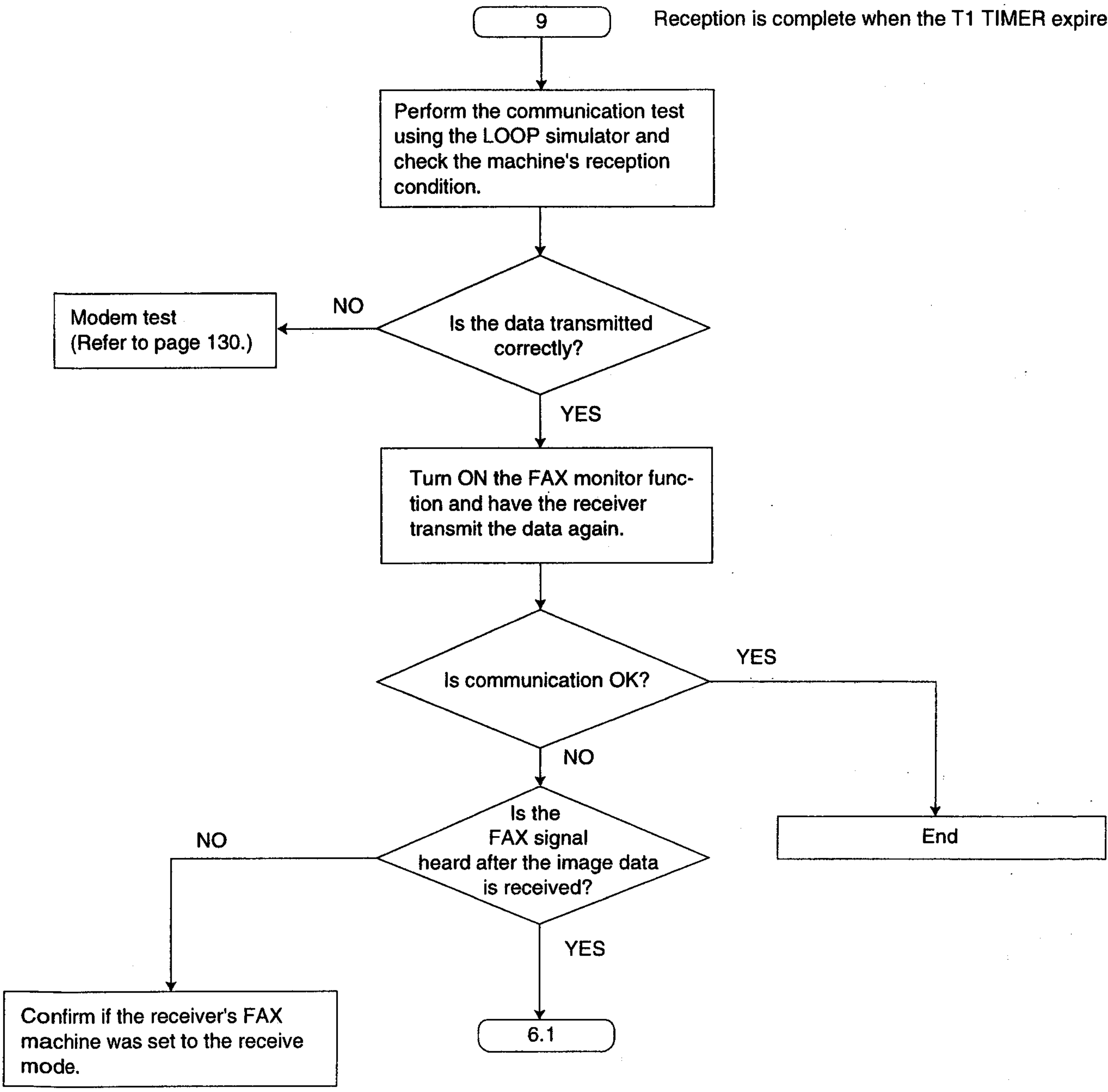

No response after the post message is transmitted three times.
4
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


RTN and PIN are received.

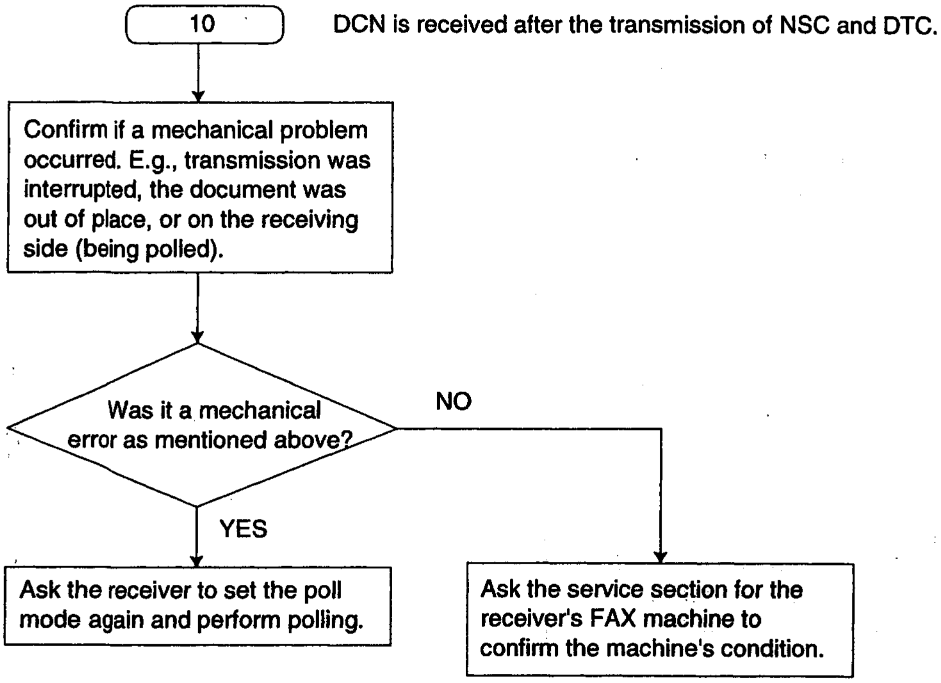

No response after FTT is transmitted.
6
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is FTT sent from the receiver?
YES
Modem test (Refer to page 130.)
6.1
NO
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

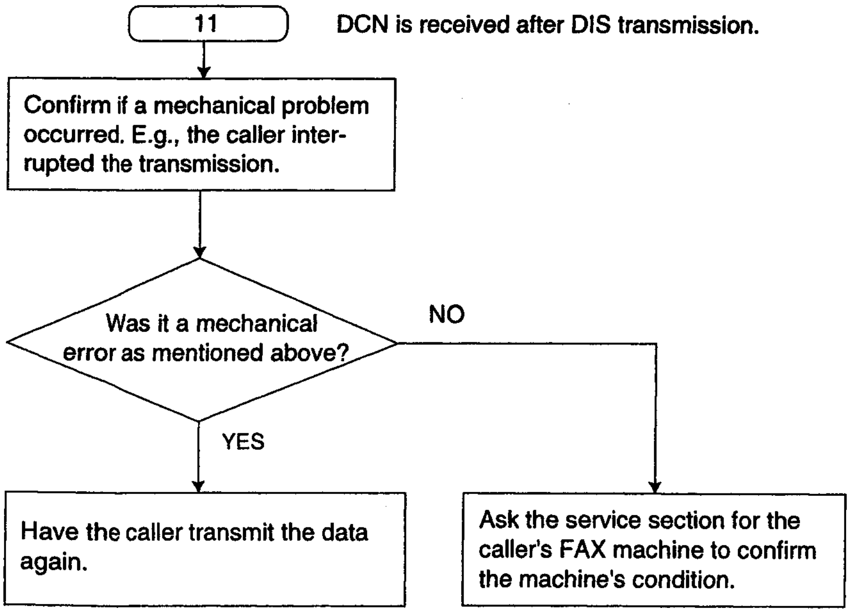

7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) heard after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Try again.
Decrease the RX speed.
Do error lines exist on the received document?
NO
7.1
YES

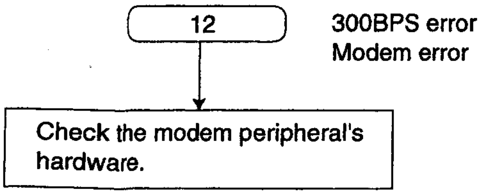

8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test
(Refer to page 130.)
NO
Is the data facsimiled correctly?
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
NO
6.1
End


Reception is complete when the T1 TIMER expires.

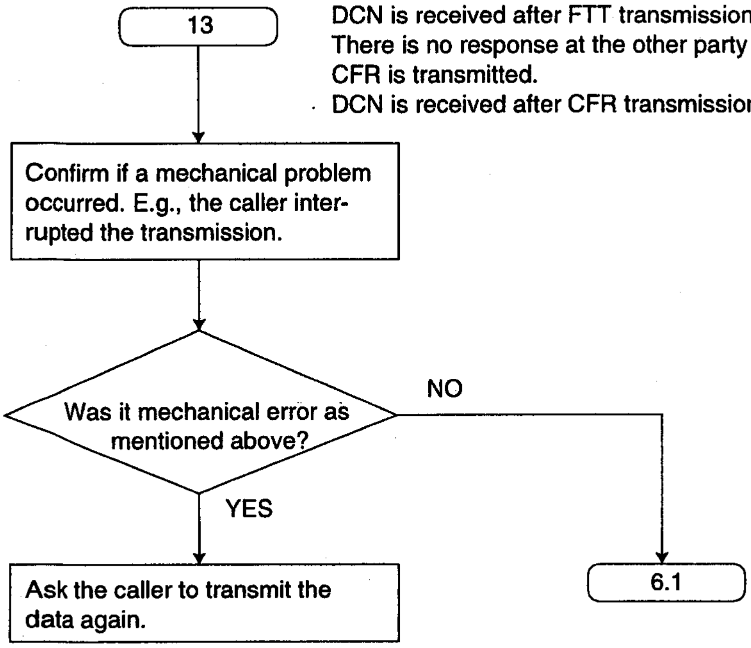
9
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to page 130.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal heard after the image data is received?
NO
Confirm if the receiver's FAX machine was set to the receive mode.
YES
6.1


DCN is received after the transmission of NSC and DTC.
10
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

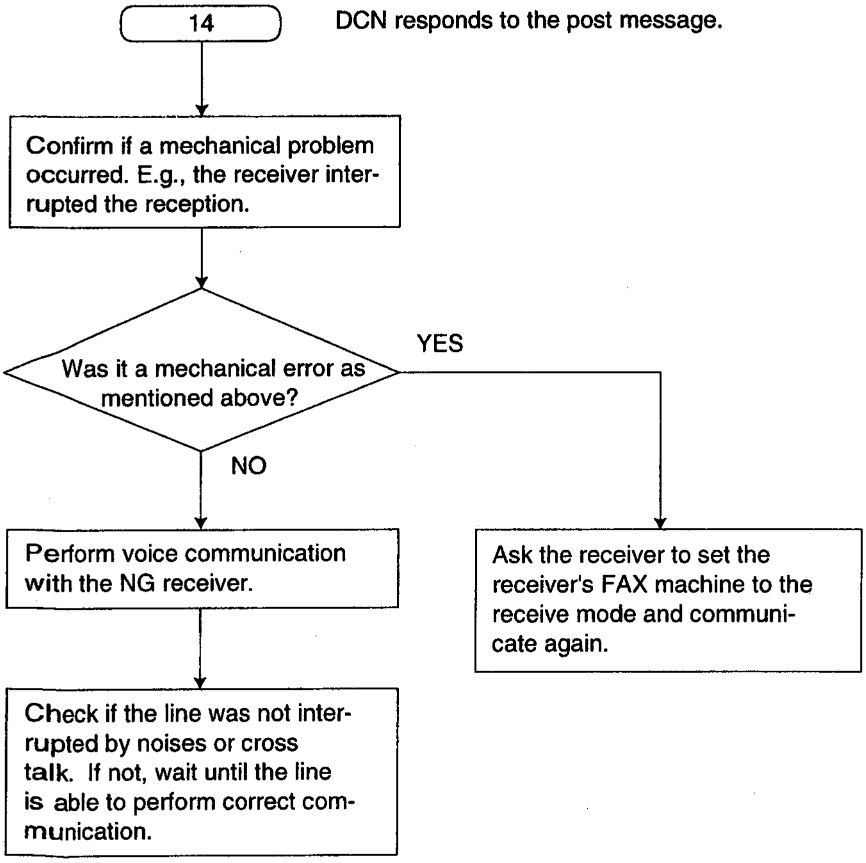

DCN is received after DIS transmission.
11
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.

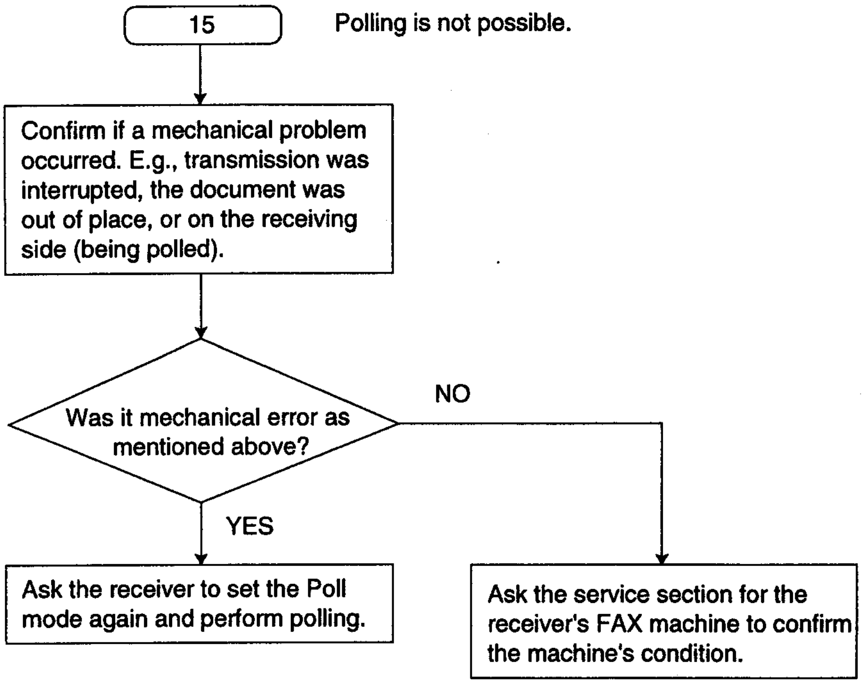

300BPS error
Modem error
12
Check the modem peripheral's hardware.

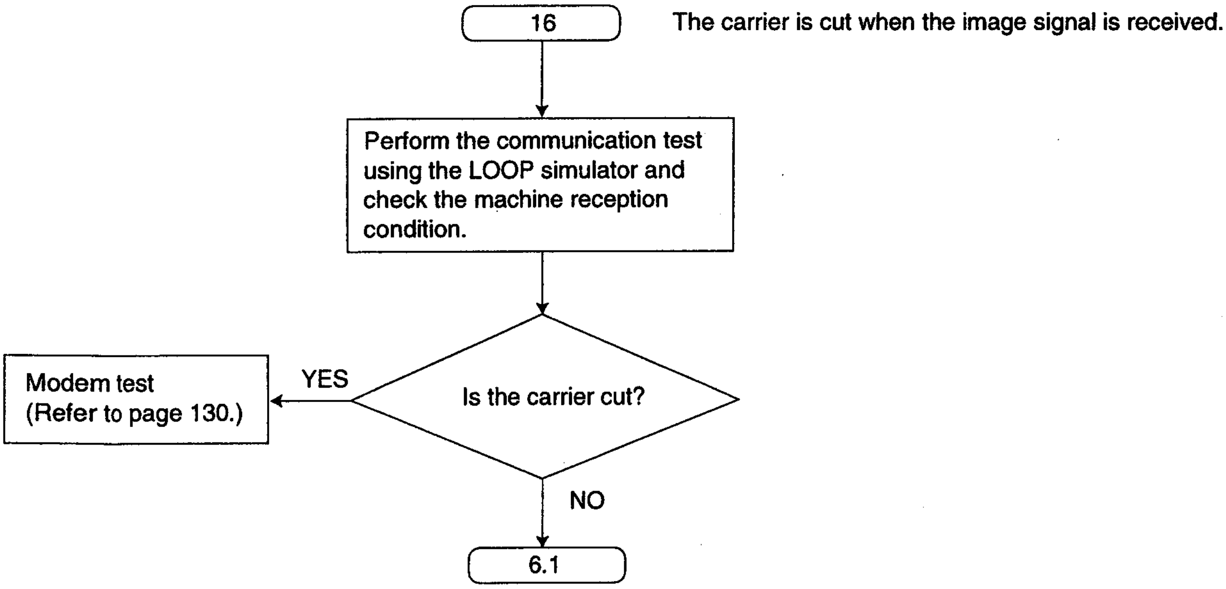
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
· DCN is received after CFR transmission.


13
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1

DCN responds to the post message.


14
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.


15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it mechanical error as mentioned above?
NO
YES
Ask the receiver to set the Poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Is the carrier cut?
YES
Modem test (Refer to page 130.)
NO
6.1

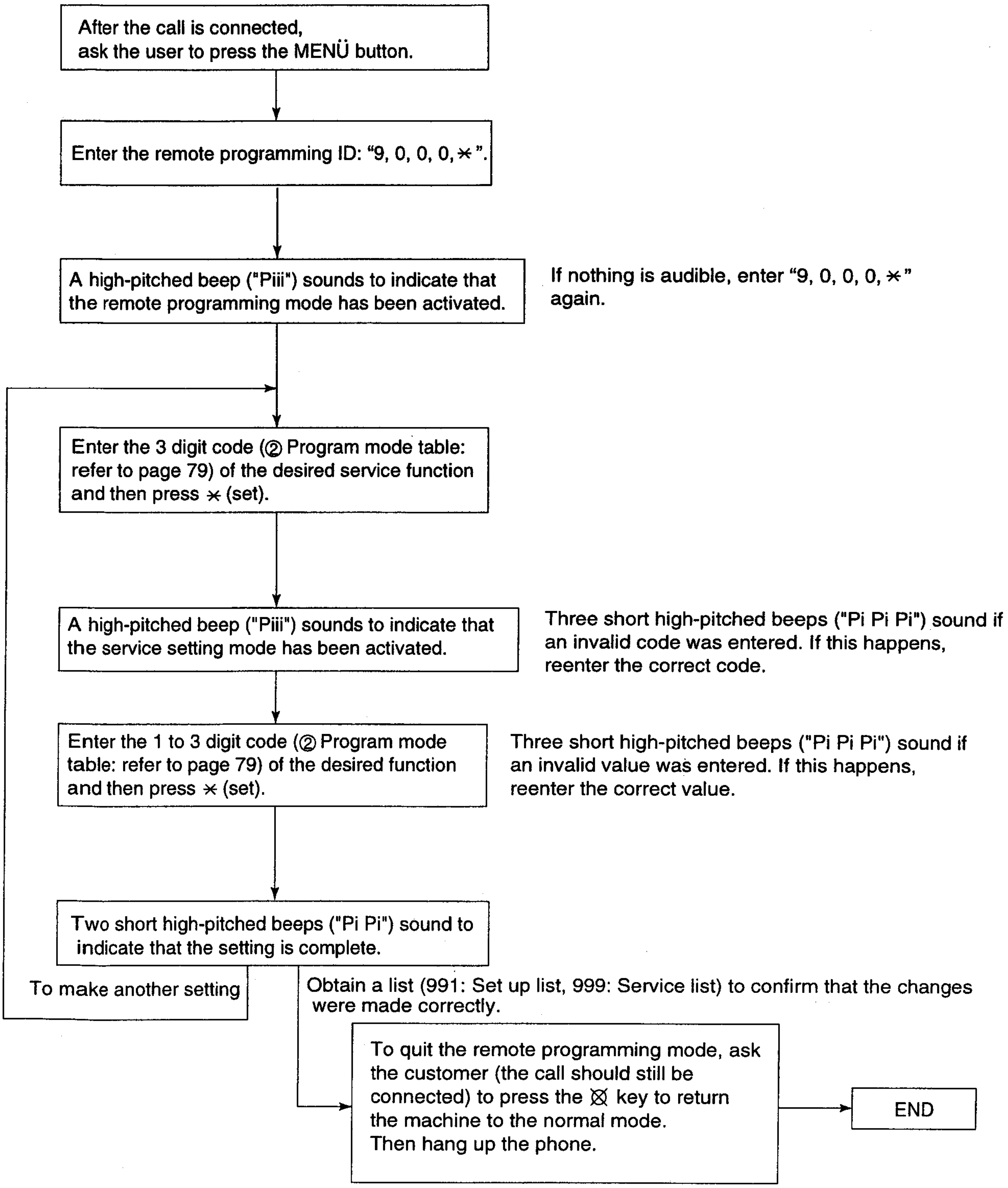
2) Remote programming

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (② Program mode table: refer to page 79). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, out put the setup list (code: 991) and service list (code: 999) from the customer's fax machine.
Based on this, the parameters for the desired codes can be changed.
The procedure for changing and listing parameters is described on the next page. Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that only the desired parameters were changed.

Hint:
Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone (if the unit has this feature.) This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

① Entering the remote programming mode and changing service codes



After the call is connected,
ask the user to press the MENÜ button.

Enter the remote programming ID: "9, 0, 0, 0, ∗".

A high-pitched beep ("Piii") sounds to indicate that the remote programming mode has been activated.

If nothing is audible, enter "9, 0, 0, 0, ∗" again.

Enter the 3 digit code (② Program mode table: refer to page 79) of the desired service function and then press ∗ (set).

A high-pitched beep ("Piii") sounds to indicate that the service setting mode has been activated.

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid code was entered. If this happens, reenter the correct code.

Enter the 1 to 3 digit code (② Program mode table: refer to page 79) of the desired function and then press ∗ (set).

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid value was entered. If this happens, reenter the correct value.

Two short high-pitched beeps ("Pi Pi") sound to indicate that the setting is complete.

To make another setting

Obtain a list (991: Set up list, 999: Service list) to confirm that the changes were made correctly.

To quit the remote programming mode, ask the customer (the call should still be connected) to press the ⊠ key to return the machine to the normal mode.
Then hang up the phone.

END

② Program Mode Table

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	mm/dd/yy hh:mm AM/PM	Jan/01/99	NG
002	Your logo	---------	None	NG
003	Your fax number	---------	None	NG
004	Print sending report	1:Error / 2:ON / 3:OFF	Error	OK
006	FAX ring count	1~9 rings	1	OK
012	Remote TAM activation	ON / OFF	OFF / ID=11	NG
013	Dialing mode	Tone / Pulse	Tone	OK
014	PC link	1:ON / 2:OFF	ON	OK
022	Journal auto print	1:ON / 2:OFF	ON	OK
023	Overseas mode	ON / OFF	OFF	NG
025	Delayed transmission	ON / OFF	OFF	NG
030	Silent FAX recognition ring	3 to 6 rings	3	OK
037	Auto reduction	ON / OFF	ON	OK
038	Halftone mode	Photo / Auto	Auto	OK
039	LCD contrast	Normal / Darker	Normal	NG
040	Silent Detection	1:ON / 2:OFF	OFF	OK
041	FAX activation code	ON / OFF	ON / ID=*9	NG
044	Memory receive alert	1:ON / 2:OFF	ON	OK
046	Friendly reception	1:ON / 2:OFF	ON	OK
048	Sprache	Deutsch / English	Deutsch	NG
060	Express-Modus	1:ON / 2:OFF	OFF	OK
062	Telfonanschliu	1:AMT/S:NBST	AMT	OK
063	AKZ1	---------		NG
064	AKZ2	---------		NG
065	AKZ3	---------		NG
066	AKZ4	---------		NG
068	ECM selection	1:ON / 2:OFF	ON	OK
071	Rufmelodie	A, B, C	A	NG
076	Connecting tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1: FAX only / 2:TEL/FAX	FAX only	OK
078	TEL/FAX delayed ring	1~9 rings	2	OK
079	Toner save	1:ON / 2:OFF	OFF	OK
080	Set default	Yes / No	NO	NG

Code	Function	Set Value	Default	Remote Setting
501	Pause time set	001~600 x 100msec	030	OK
502	Flash time set	01~99 x 10msec	20	OK
503	Dial speed	1:10pps / 2:20pps	10pps	OK
511	Vox sense	1: High / 2: Low	High	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	OFF	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
524	Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
561	Key test	---------	---------	NG
563	CIS position adjustment	1~7	4	OK
570	Break % select	1:61% / 2:67%	61%	OK
571	ITS auto redial time set	00~99	05	OK
572	ITS auto redial line disconnection time set	001~999sec	065	OK
573	Remote turn-on ring number	01~99	10	OK
574	Dial Tone Detect	1:ON / 2:OFF	OFF	OK
575	OFF-HOOK alarm option	1:ON / 2:OFF	ON	OK
576	DC-Loop Detect	1:ON / 2:OFF	OFF	OK
590	FAX auto redial time set	00~99	05	OK
591	FAX auto redial line disconnection time set	001~999sec	065	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	OK
595	Receive error limit value	1:5% / 2:10% / 3:15% / 4:20%	10	OK
596	Transmit level set	-15~00dBm	9	OK
598	Receiving Sensitivity	20~48	41	OK
599	ECM Memory size	1:256K byte / 2:64K byte	256K byte	OK
*605	Recall mode	1: Flash / 2: Earth Recall	Flash	OK
624	AT ring time out	1: 3 sec / 2: 5 sec	3 sec	OK
630	Time of power save starting	1~30min	5min	OK

* 605: Used only when the option in use.

Code	Function	Set Value	Default	Remote Setting
700	ETX. TAM OGM Rec. time	01~99sec	16 sec	OK
701	No voice detect time	01~99	40x100msec	OK
717	Transmit speed select	1:14400/ 2:12000/ 3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	1:14400/ 2:12000/ 3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK
721	Pause tone detect	1:ON / 2:OFF	ON	OK
722	Redial tone detect	1:ON / 2:OFF	ON	OK
724	Busy tone detection for PC fax transmission	1:ON / 2:OFF	ON	OK
732	Auto disconnect	1:350ms / 2:1800ms / 3:OFF	350msec	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
788	Shading and detecting white peak level	---------	---------	NG
815	Sensor & VOX test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~5	---------	OK
854	Left margin	1~3	---------	OK
861	A4 size set	1:ON / 2:OFF	ON	
880	History list	1:Start	---------	NG
881	Journal 2 list	1:Start	---------	OK
882	Journal 3 list	1:Start	---------	OK
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK

3.10 ELECTRICAL SECTION

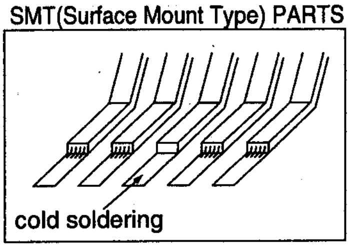
3.10.1 Digital Board Section

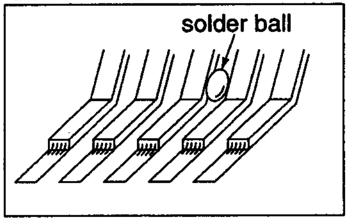
When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.

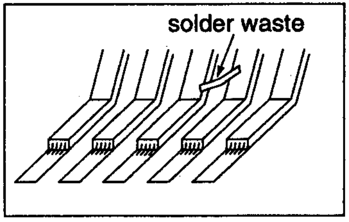
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)

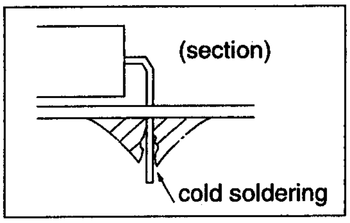
The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first.
If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).

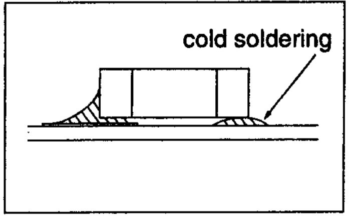
Note:

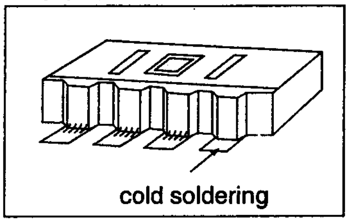

SMT(Surface Mount Type) PARTS


SMT PARTS


SMT PARTS


LEADED PARTS


CHIP PARTS (section)


RESISTOR ARRAY

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

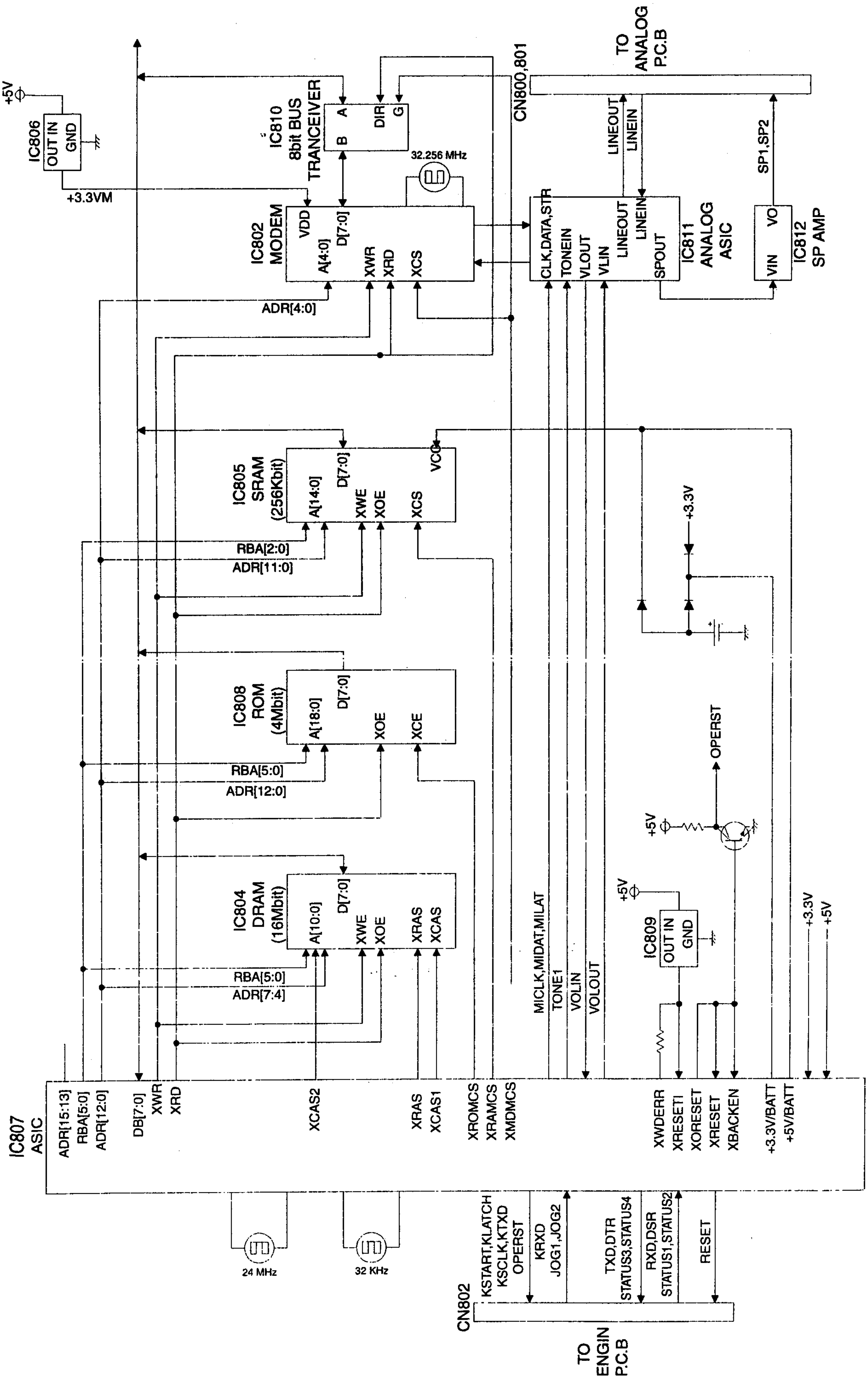
Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM, DRAM and ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.

> Don't replace ICs or stop repairing until checking the signal lines.
> An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

Please refer to **Digital Block Diagram**.(Next page)
The ASIC (IC807) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC808), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.
It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.
These signal lines are all controlled by voltages of 5V (H) or 0V (L).

DIGITAL BLOCK DIAGRAM



+5V
IC806
OUT IN
GND
+3.3VM
IC810
8bit BUS
TRANCEIVER
A
B
DIR
G
32.256 MHz
IC802
MODEM
VDD
A[4:0]
D[7:0]
XWR
XRD
XCS
ADR[4:0]
CN800,801
TO
ANALOG
P.C.B
LINEOUT
LINEIN
SP1,SP2
CLK,DATA,STR
TONEIN
VLOUT
VLIN
LINEOUT
LINEIN
SPOUT
IC811
ANALOG
ASIC
VIN
VO
IC812
SP AMP
IC805
SRAM
(256Kbit)
A[14:0]
D[7:0]
XWE
XOE
XCS
VCC
RBA[2:0]
ADR[11:0]
+3.3V
IC808
ROM
(4Mbit)
A[18:0]
D[7:0]
XOE
XCE
RBA[5:0]
ADR[12:0]
OPERST
+5V
IC804
DRAM
(16Mbit)
A[10:0]
D[7:0]
XWE
XOE
XRAS
XCAS
RBA[5:0]
ADR[7:4]
+5V
IC809
OUT IN
GND
MICLK,MIDAT,MILAT
TONE1
VOLIN
VOLOUT
+3.3V
+5V
IC807
ASIC
ADR[15:13]
RBA[5:0]
ADR[12:0]
DB[7:0]
XWR
XRD
XCAS2
XRAS
XCAS1
XROMCS
XRAMCS
XMDMCS
XWDERR
XRESETI
XORESET
XRESET
XBACKEN
+3.3V/BATT
+5V/BATT
24 MHz
32 KHz
CN802
KSTART,KLATCH
KSCLK,KTXD
OPERST
KRXD
JOG1,JOG2
TXD,DTR
STATUS3,STATUS4
RXD,DSR
STATUS1,STATUS2
RESET
TO
ENGIN
P.C.B

The signal lines that must be normal for the system to boot up are listed here [List 1].
For signal lines other than these, even if they malfunction, they do not directly affect booting up the system.

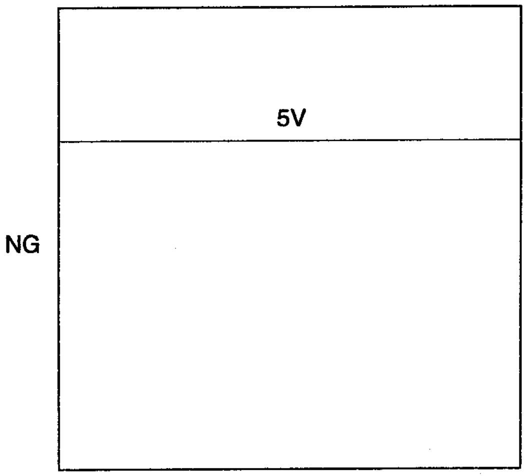
[List 1]

①	D0~D7	(Data Bus)
①	A0~A15	(Address Bus)
②	$\overline{RD}$	(Read Signal)
	$\overline{ROMCS}$	(ROM Select Signal)
	$\overline{WR}$	(Write Signal)
	$\overline{RAMCS}$	(SRAM Select Signal)
④	RBA0~RBA5	(Bank Address Signal)
⑤	$\overline{RAS}$	(DRAM Row Address Strobe Signal)
	$\overline{CAS1}$, $\overline{CAS2}$	(DRAM Column Address Strobe Signal)
⑥	$\overline{MDMCS}$	(Modem Select Signal)

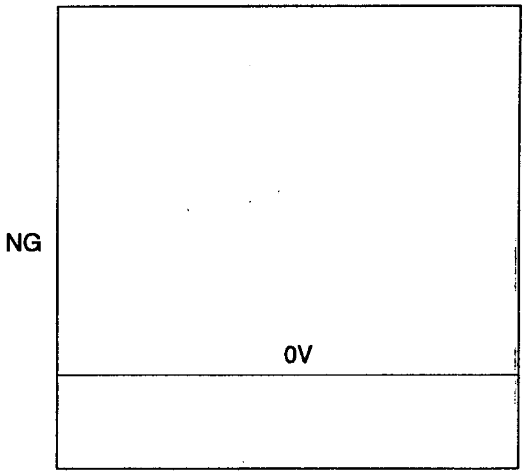
If these signals are in the normal condition, once the power is turned on, each IC repeatedly output 5V (H) and 0V (L). The following page shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)

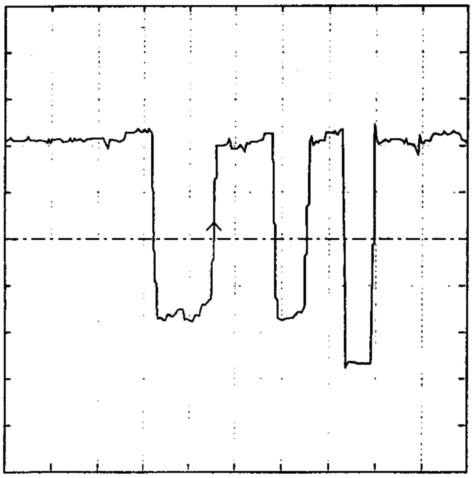
0V never appears.



5V never appears.

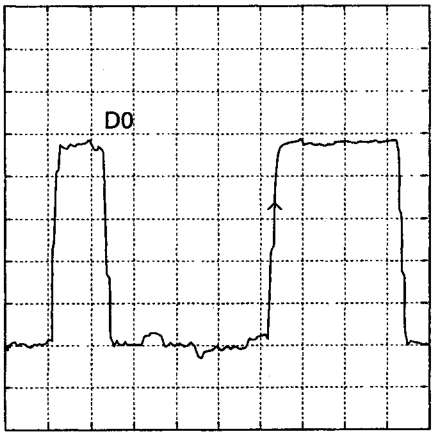


Short between D0 and D1
500ns/div, 1V/div

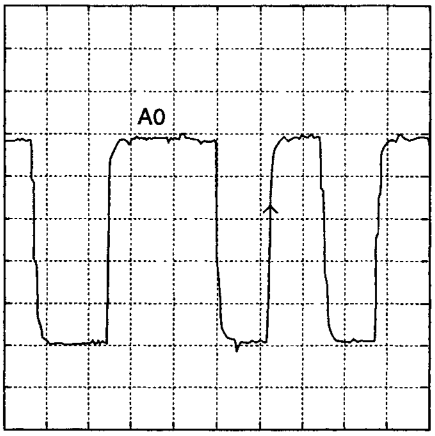


Normal Wave Patterns

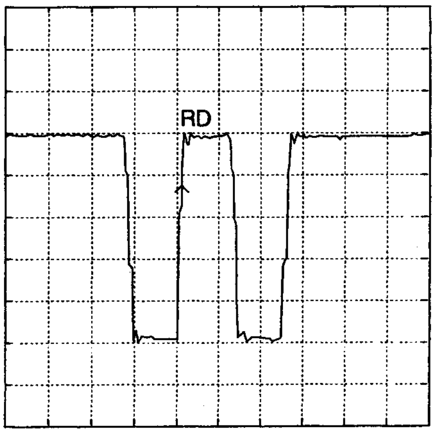
① D0~D7 200ns/div, 1V/div



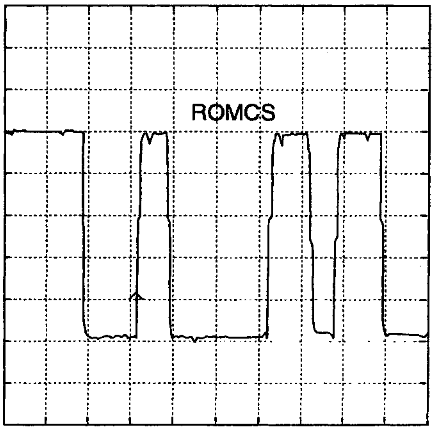
② A0~A5 200ns/div, 1V/div



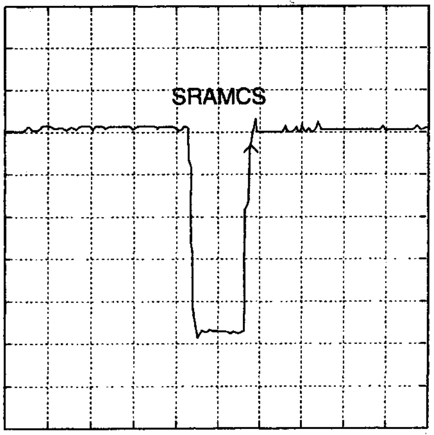
③ $\overline{\text{RD}}$ 100ns/div, 1V/div



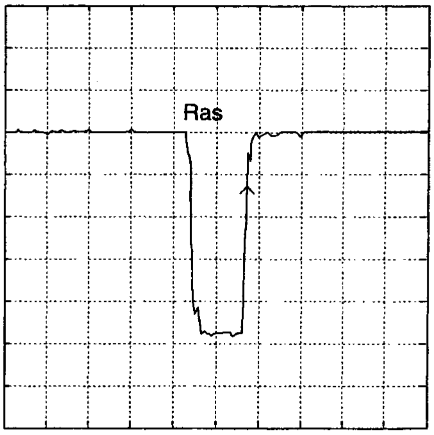
③ $\overline{\text{ROMCS}}$ 500ns/div, 1V/div



③ $\overline{\text{RAMCS}}$ 500ns/div, 1V/div



⑤ $\overline{\text{RAS}}$, $\overline{\text{CAS}}$ 100ns/div, 1V/div



Remarks:

For these reasons and the software sequence to boot up the unit, if you use an oscilloscope to judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (If the ASIC failed to access the ROM, the ASIC cannot access SRAM or DRAM normally.)

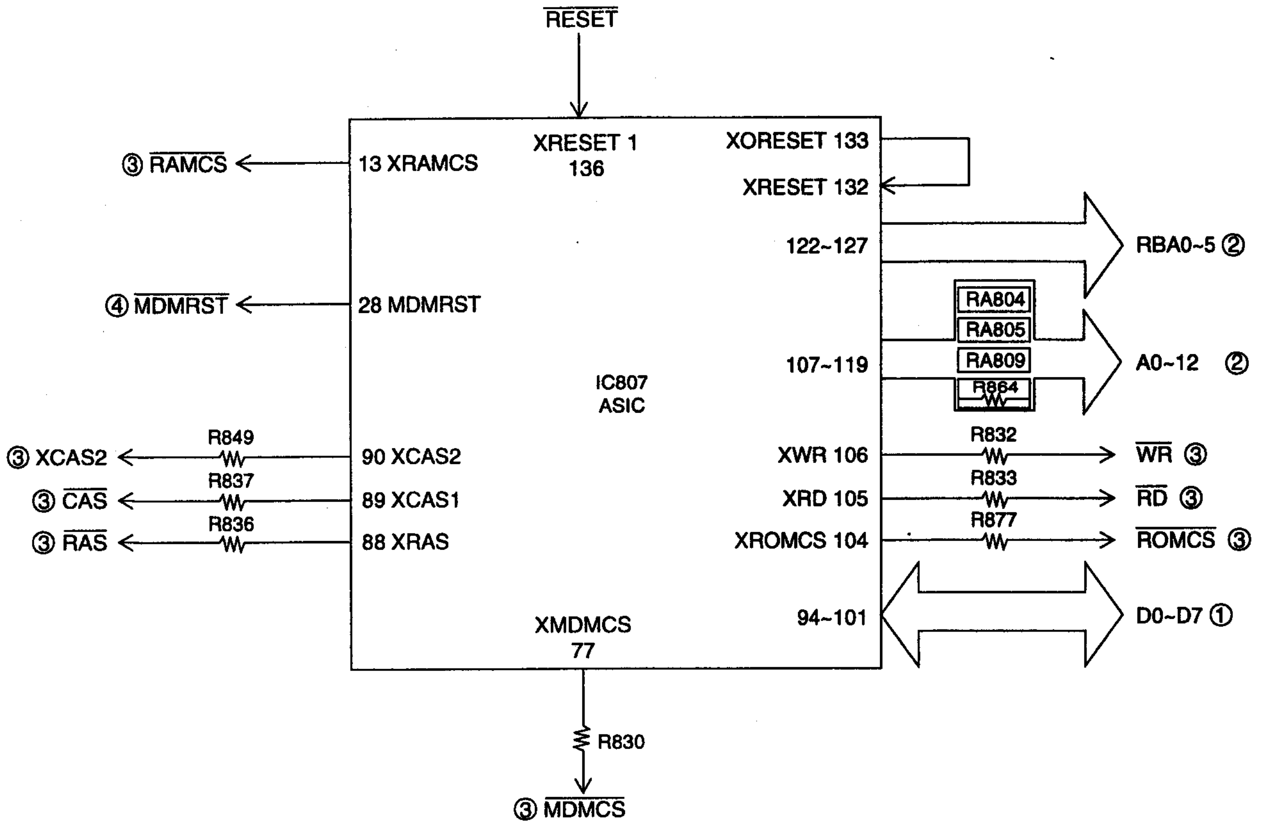
The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even of the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.)

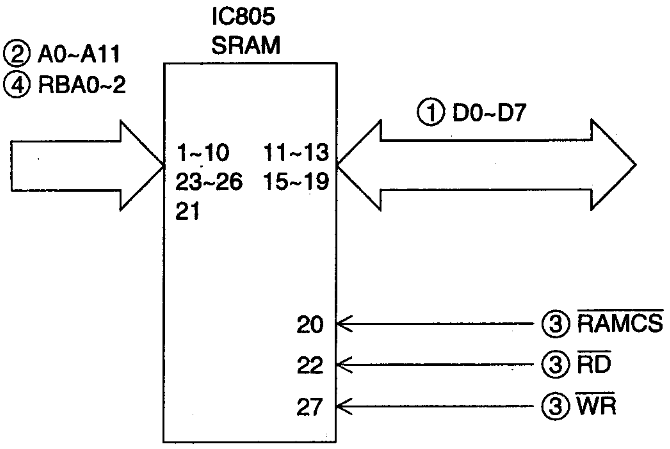
Accordingly, the problem presented here is whether each IC outputs the correct signal. (See the I/O directiondiagram on the next page.) In other words, is it constantly switching between 5V (H) and 0V (L) as described earlier.

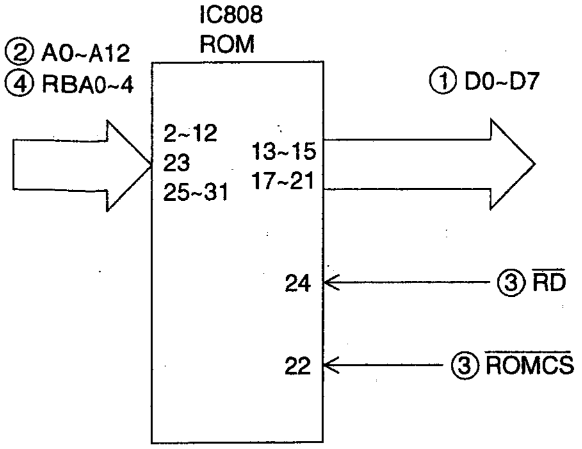
Note:

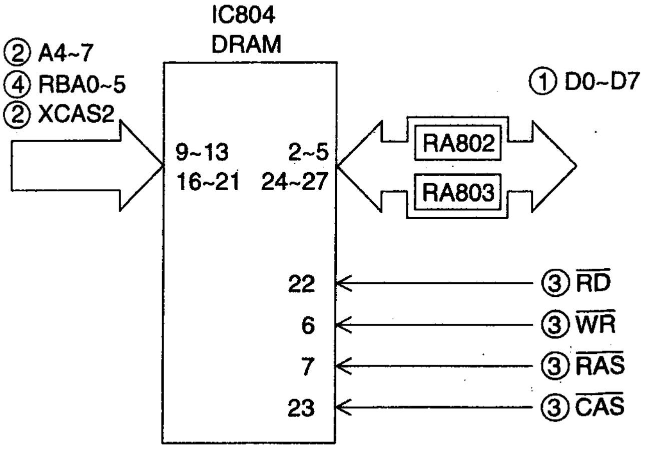
All you have to do is check that the IC repeatedly outputs (H) 5V and (L) 0V.

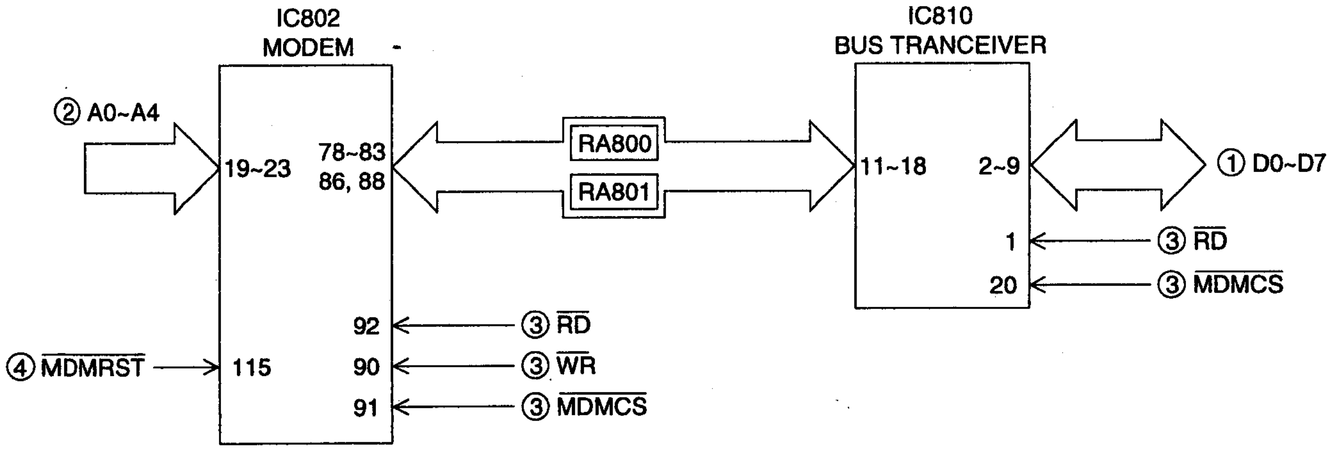
I/O and Pin No. Diagram


RESET
XRESET 1
136
XORESET 133
XRESET 132
③ RAMCS
13 XRAMCS
122~127
RBA0~5 ②
④ MDMRST
28 MDMRST
RA804
RA805
RA809
R864
107~119
A0~12 ②
IC807
ASIC
R849
③ XCAS2
90 XCAS2
R837
③ CAS
89 XCAS1
R836
③ RAS
88 XRAS
XWR 106
R832
WR ③
XRD 105
R833
RD ③
XROMCS 104
R877
ROMCS ③
94~101
D0~D7 ①
XMDMCS
77
R830
③ MDMCS

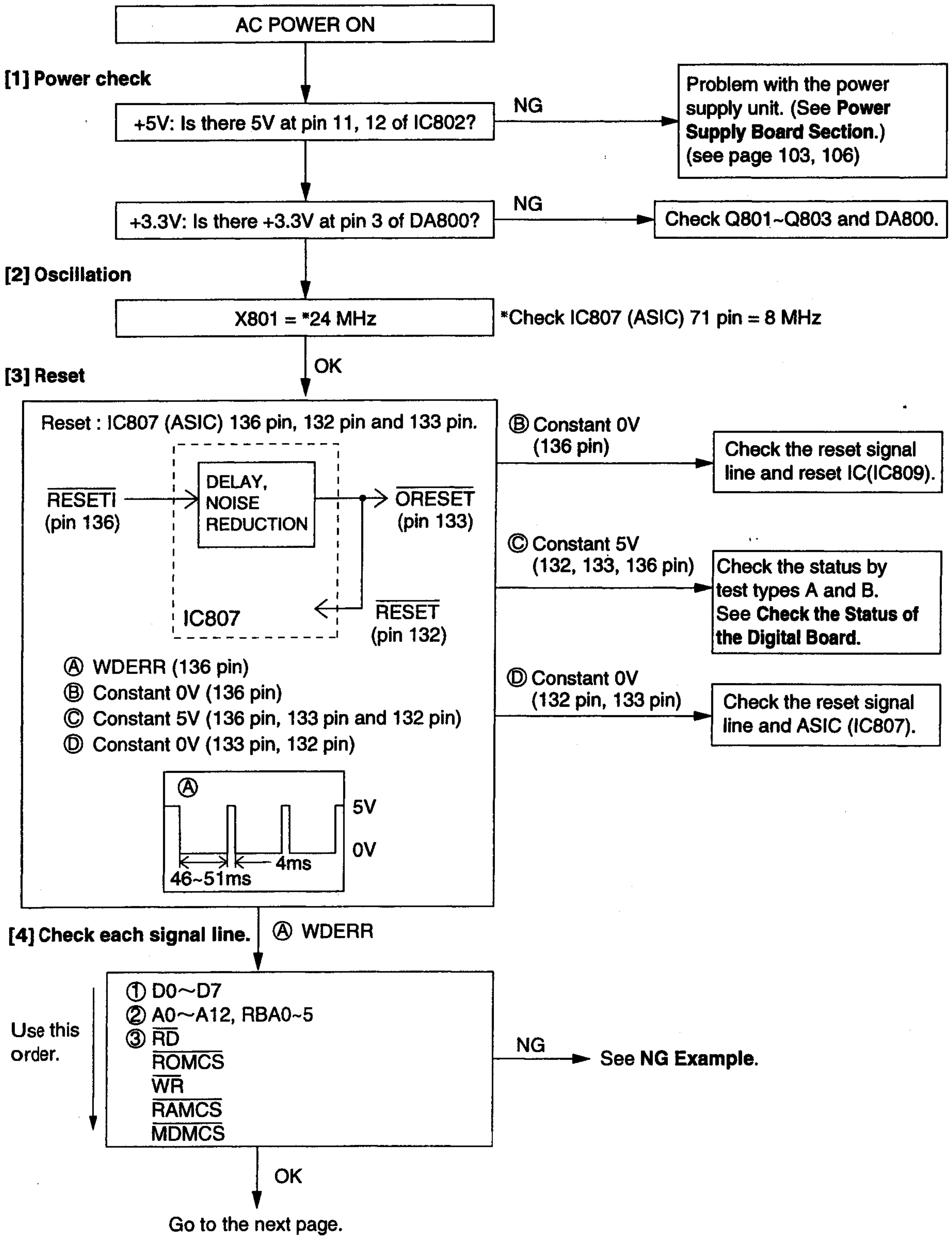

IC805
SRAM
② A0~A11
④ RBA0~2
1~10
23~26
21
11~13
15~19
① D0~D7
20
③ RAMCS
22
③ RD
27
③ WR


IC808
ROM
② A0~A12
④ RBA0~4
2~12
23
25~31
13~15
17~21
① D0~D7
24
③ RD
22
③ ROMCS


IC804
DRAM
② A4~7
④ RBA0~5
② XCAS2
9~13
16~21
2~5
24~27
RA802
RA803
① D0~D7
22
③ RD
6
③ WR
7
③ RAS
23
③ CAS


IC802
MODEM
IC810
BUS TRANCEIVER
② A0~A4
19~23
78~83
86, 88
RA800
RA801
11~18
2~9
① D0~D7
1
③ RD
20
③ MDMCS
92
③ RD
④ MDMRST
115
90
③ WR
91
③ MDMCS

After the power is turned on, the ASIC initializes and checks each IC.
The ROM, SRAM, and modem are checked.
If initialization fails for the ICs , the system will not boot up.
In this case, please find the cause as follows.



AC POWER ON

[1] Power check

+5V: Is there 5V at pin 11, 12 of IC802?

NG → Problem with the power supply unit. (See **Power Supply Board Section.**) (see page 103, 106)

+3.3V: Is there +3.3V at pin 3 of DA800?

NG → Check Q801~Q803 and DA800.

[2] Oscillation

X801 = *24 MHz

*Check IC807 (ASIC) 71 pin = 8 MHz

[3] Reset

Reset : IC807 (ASIC) 136 pin, 132 pin and 133 pin.

Ⓐ WDERR (136 pin)
Ⓑ Constant 0V (136 pin)
Ⓒ Constant 5V (136 pin, 133 pin and 132 pin)
Ⓓ Constant 0V (133 pin, 132 pin)

Ⓑ Constant 0V (136 pin) → Check the reset signal line and reset IC(IC809).

Ⓒ Constant 5V (132, 133, 136 pin) → Check the status by test types A and B. See **Check the Status of the Digital Board.**

Ⓓ Constant 0V (132 pin, 133 pin) → Check the reset signal line and ASIC (IC807).

[4] Check each signal line. Ⓐ WDERR

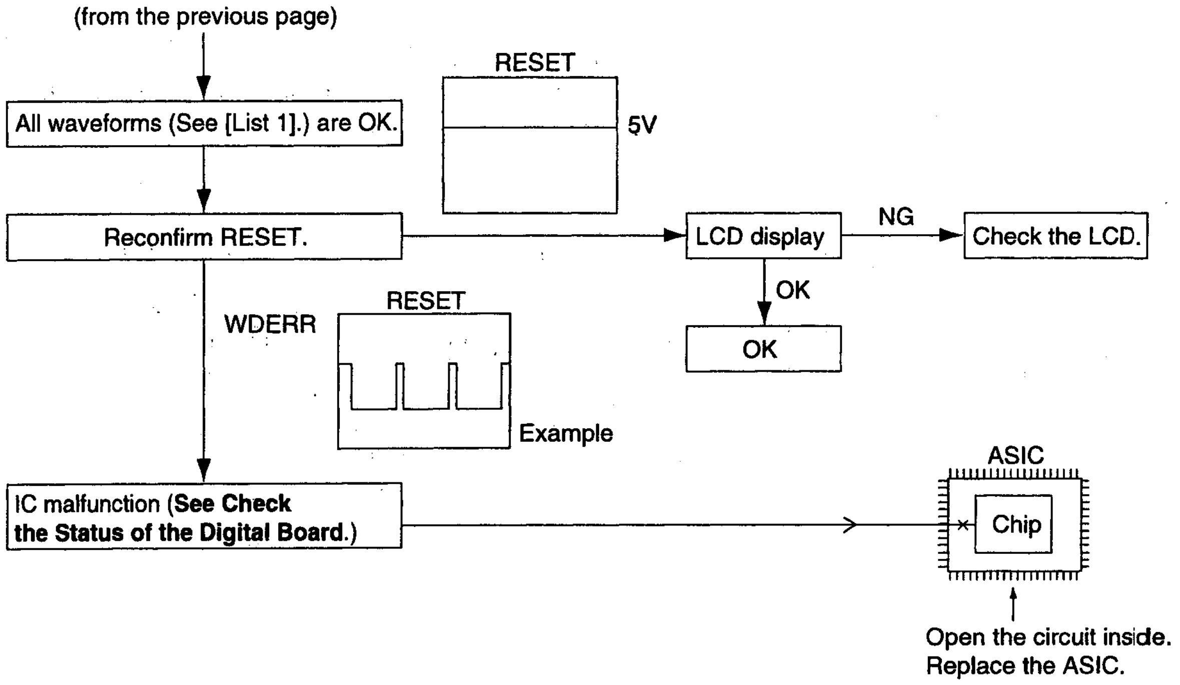
Use this order.

① D0~D7
② A0~A12, RBA0~5
③ $\overline{\text{RD}}$
$\overline{\text{ROMCS}}$
$\overline{\text{WR}}$
$\overline{\text{RAMCS}}$
$\overline{\text{MDMCS}}$

NG → See **NG Example.**

Go to the next page.

NG
NG
OK
$\overline{\text{RESETI}}$ (pin 136)
DELAY, NOISE REDUCTION
$\overline{\text{ORESET}}$ (pin 133)
IC807
$\overline{\text{RESET}}$ (pin 132)
Ⓐ
5V
0V
4ms
46~51ms
NG
OK

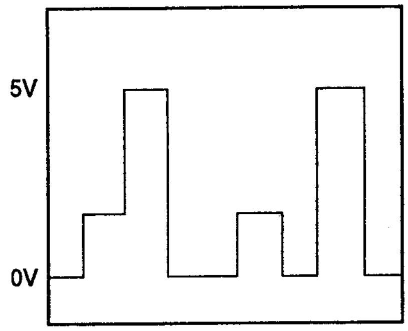

(from the previous page)
All waveforms (See [List 1].) are OK.
RESET
5V
Reconfirm RESET.
LCD display
NG
Check the LCD.
OK
OK
WDERR
RESET
Example
IC malfunction (See Check the Status of the Digital Board.)
ASIC
Chip
Open the circuit inside.
Replace the ASIC.

Other NG examples while the power is ON and the LCD displays the following.

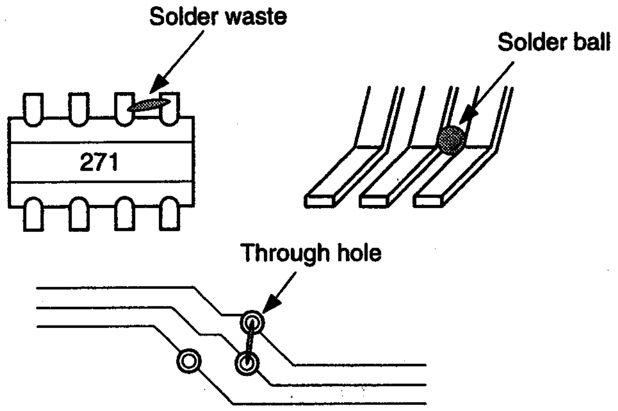
LCD display Service notw FS → The error is displayed when the heater head does not warm up, or the LSU does not work.

NG Example

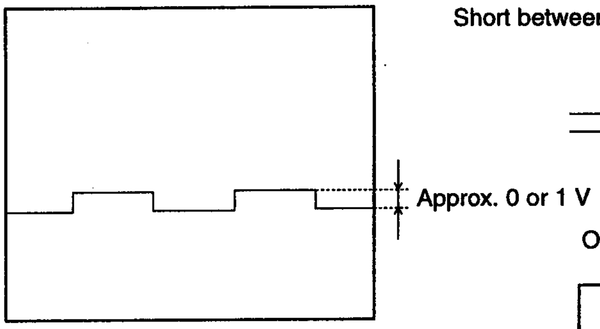
1.



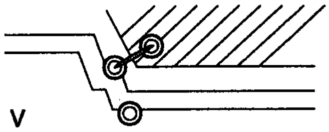
Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.


Solder waste
Solder ball
271
Through hole

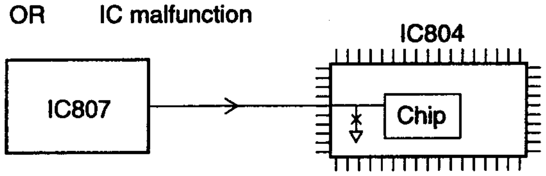
2.



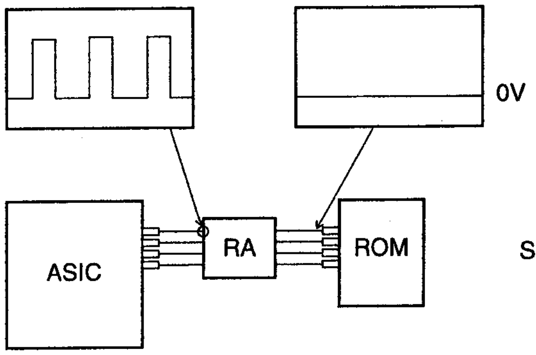
Short between the signal line and GND.



OR IC malfunction


IC804
IC807
Chip

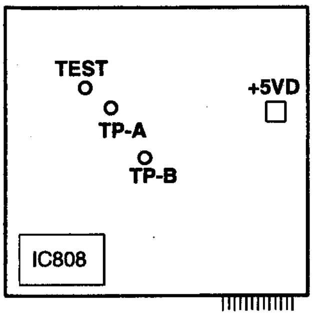
3.


0V
ASIC
RA
ROM

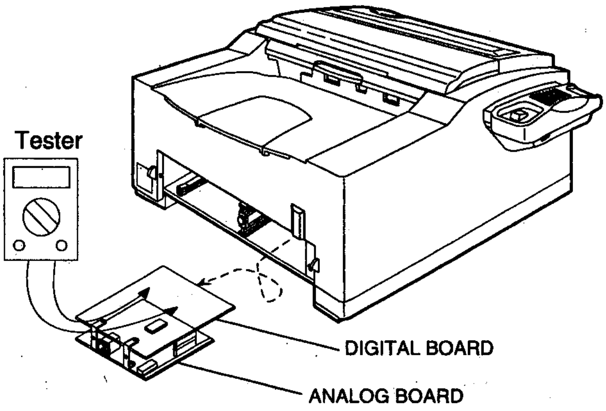
Solder fault on RA.

Please check the status (voltage) of test lands **TP-A** and **TP-B**.
The result may tell you a defective point.

(TEST LAND)



DIGITAL BOARD
(BOTTOM VIEW)



- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the **TEST** point and **+5V** land, and turn on the AC power for a few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

Defective point	Check point voltage		Check items
	TP-A	TP-B	
RTC (IC807)	0V	0V	IC807(RTC is included in IC807)
DRAM (IC804)	0V	5V	IC804(7,23 pin), R836, R837, R841, IC807(88, 89 pin)
MODEM (IC802)	5V	0V	IC807(77 pin), IC802(90~92 pin), R830, R812, RA800, RA801, IC810(1, 19 pin), L805, X800
ALL OK	5V	5V	

- This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all connected to the ASIC properly and that control from the ASIC is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

If you still have a problem with the digital board, please refer to **NG wave pattern**. (See page 85.)

310.2 Analog Board Section

The analog parts check is actually different than the digital parts check. The signal route is determined by the purpose of the check. For example, the handset TX route begins from the handset microphone and is output in the telephone line. In this route, it is mainly an analog signal. Tracing the signal can be done easily using an oscilloscope. Each route is shown on the Check Sheet here. If there is a problem with the unit (for example, you cannot communicate with the H/S, etc.), trace the signal in the area and determine the cause.

CHECK SHEET

(SYMPTOM) CHECK ITEMS		IN → Signal ROUTE → OUT
MONITOR		TEL LINE-T601-R654-C642-R663-IC601(2-1)-(BPF)-C651-CN604(5)-{CN801(5)-C910-R923-IC811(23-34)-C904-R954-IC807(42-41)-C914-R922-IC811(32-35)-C930-R942 IC812(4-5)-L809-CN801(17)}-CN604(17)-L613-CN603(7)-SPEAKER IC812(4-8)-L808-CN801(18)}-CN604(18)-L614-CN603(8)
HANDSET Tx		HS MIC-CN603(4)-L608-C637-R645-IC603(2-1)-C701-R711-CN604(12)-{CN801(12)-IC811(15-22)- CN603(2)-L606-C650-R661-IC603(3-1) CN801(7)}-CN604(7)-C638-R714-R647-IC601(6-7)-C633-R642-R641-T601-TEL LINE
HANDSET Rx		TEL LINE-T601-C654-C642-R663-IC601(2-1)-(BPF)-C651-CN604(5)-{CN801(5)-C910-R923-IC811(23-34)-C904-R954-IC807(42-41)-C914-R922-IC811(32-11)-CN801(13)}-CN604(13)-R674-C664-IC602(3-4)-C665-R675-IC603(6-7)-C668-R677-Q612-C658-L605-CN603(1)-HANDSET SPEAKER
DTMF Monitor	Speaker	{IC802(69)-R938-C922-IC811(24-35)-C930-R942 IC812(4-5)-L809-CN801(17)}-CN604(17)-L613-CN603(7)-SPEAKER IC812(4-8)-L808-CN801(18)}-CN604(18)-L614-CN603(8)
	Handset	{IC802(69)-R938-C922-IC811(24-11)-CN801(13)}-CN604(13)-R674-C664-IC602(3-4)-C665-R675-IC603(6-7)-C668-R677-Q612-C658-L605-CN603(1)-HANDSET SPEAKER
DTMF for TEL Line FAX Tx		{IC802(69)-R938-C922-IC811(24-22)-CN801(7)}-CN604(7)-C638-R714-R647-IC601(6-7)-C633-R642-R641-T601-TEL LINE
Dummy Ring Back tone		{IC807(38)-C909-R920-IC811(27-22)-CN801(7)}-CN604(7)-C638-R714-R647-IC601(6-7)-C633-R642-R641-T601-TEL LINE
Ringing/ Alarm/Beep/ Key tones		{IC807(38)-C909-R920-IC811(27-35)-C930-R942 IC812(4-5)-L809-CN801(17)}-CN604(17)-L613-CN603(7)-SPEAKER IC812(4-8)-L808-CN801(18)}-CN604(18)-L614-CN603(8)

(SYMPTOM) CHECK ITEMS	IN → Signal ROUTE → OUT
CNG/DTMF detection	TEL LINE-T600-CN604(10)-{CN801(10)-C911-R925-IC811(20-31)-C924-R939-IC802(60)}
VOX	TEL LINE-T600-CN604(10)-{CN801(10)-C911-R925-IC811(20-21)-C923-R931-Q805-R956-C936-IC811(7-5)-IC807(53)}
FAX Rx	TEL LINE-T601-R654-C642-R663-IC601(2-1)-(BPF)-C651-CN604(5)-{CN801(5)-C910-R923-IC811(23-31)-C924-R939-IC802(60)}

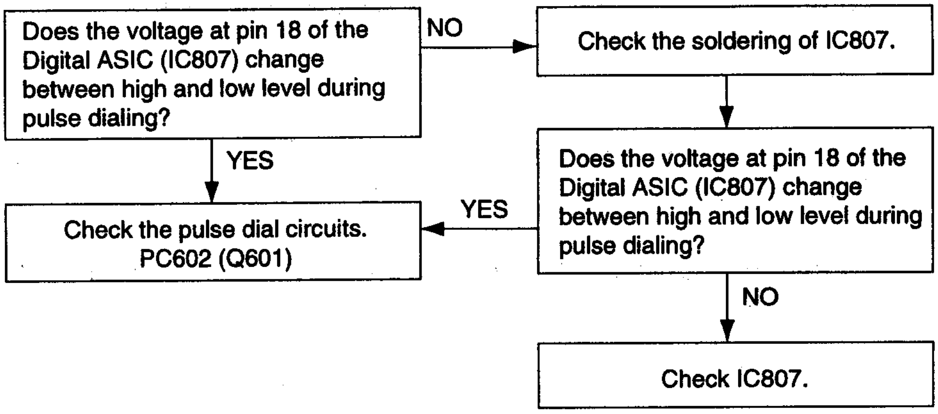
Note:

{ }: Inside the digital board

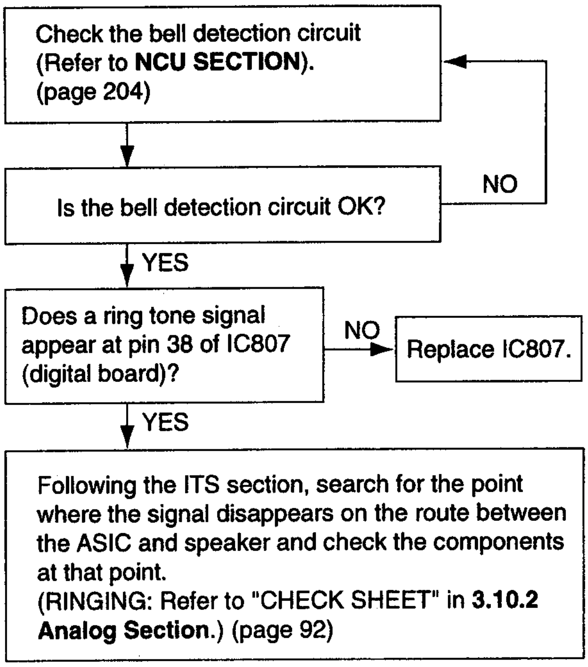
a. No handset and speakerphone transmission / reception

Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. "CHECK SHEET" in 3.10.2 Analog Board Section is useful for this investigation.

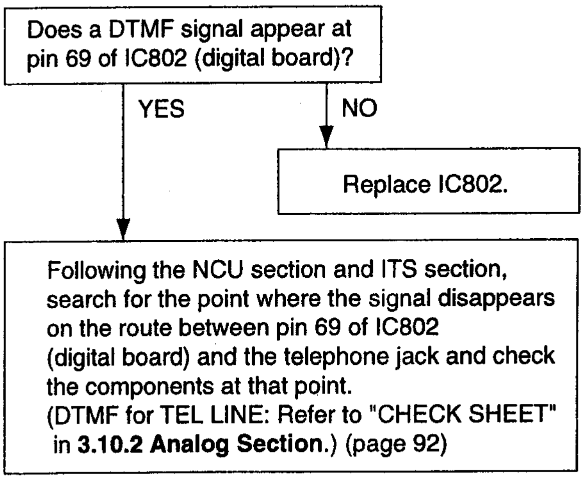
b. No pulse dialing


Does the voltage at pin 18 of the Digital ASIC (IC807) change between high and low level during pulse dialing?
NO
Check the soldering of IC807.
YES
Check the pulse dial circuits. PC602 (Q601)
YES
Does the voltage at pin 18 of the Digital ASIC (IC807) change between high and low level during pulse dialing?
NO
Check IC807.

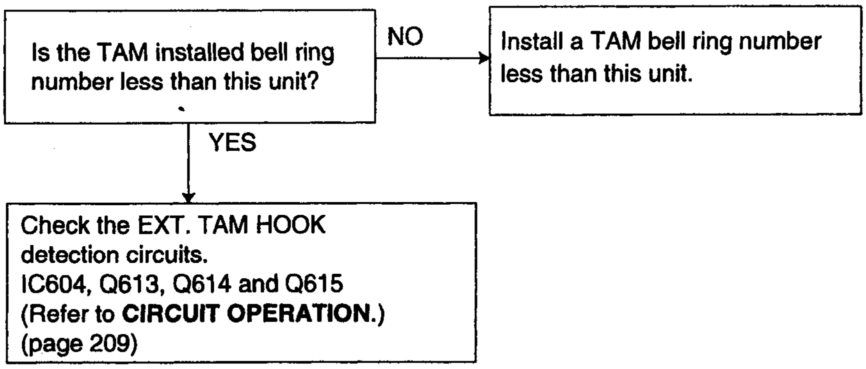
c. No ring tone (or No bell)


Check the bell detection circuit (Refer to NCU SECTION). (page 204)
Is the bell detection circuit OK?
NO
YES
Does a ring tone signal appear at pin 38 of IC807 (digital board)?
NO
Replace IC807.
YES
Following the ITS section, search for the point where the signal disappears on the route between the ASIC and speaker and check the components at that point. (RINGING: Refer to "CHECK SHEET" in 3.10.2 Analog Section.) (page 92)

d. No tone dialing


Does a DTMF signal appear at pin 69 of IC802 (digital board)?
YES
NO
Replace IC802.
Following the NCU section and ITS section, search for the point where the signal disappears on the route between pin 69 of IC802 (digital board) and the telephone jack and check the components at that point. (DTMF for TEL LINE: Refer to "CHECK SHEET" in 3.10.2 Analog Section.) (page 92)

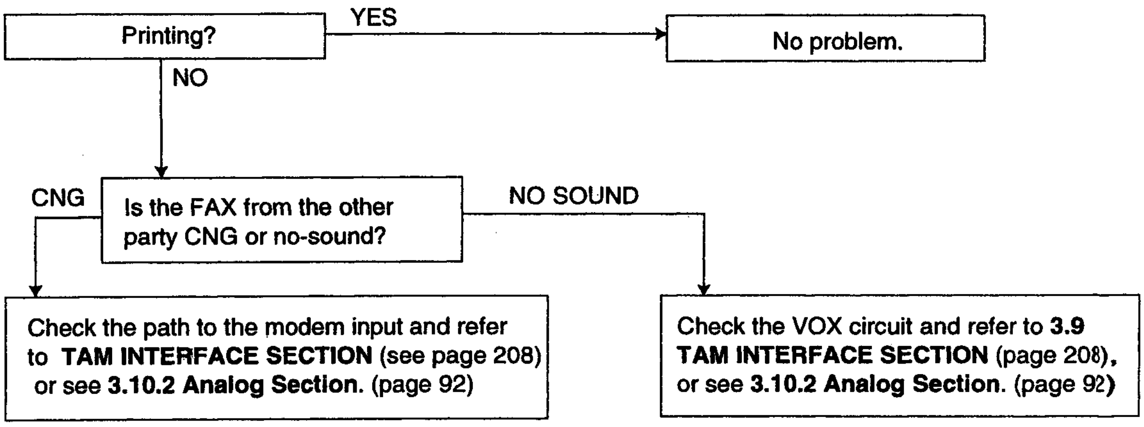
a. The FAX turns on, but does not arrive through TAM.


Is the TAM installed bell ring number less than this unit?

Install a TAM bell ring number less than this unit.

Check the EXT. TAM HOOK detection circuits.
IC604, Q613, Q614 and Q615
(Refer to **CIRCUIT OPERATION.**)
(page 209)

b. A FAX is received, but won't switch from TAM to FAX.


Printing?

No problem.

Is the FAX from the other party CNG or no-sound?

Check the path to the modem input and refer to **TAM INTERFACE SECTION** (see page 208) or see **3.10.2 Analog Section.** (page 92)

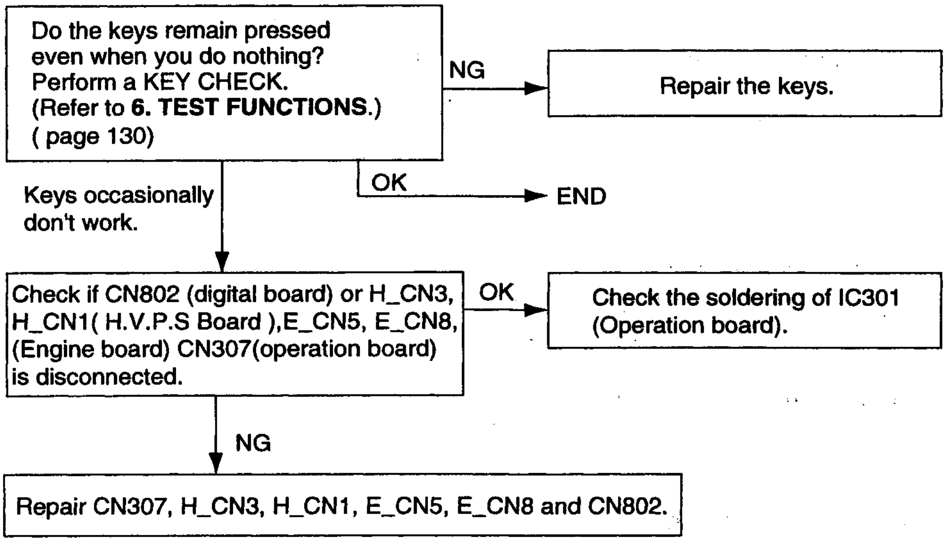
Check the VOX circuit and refer to **3.9 TAM INTERFACE SECTION** (page 208), or see **3.10.2 Analog Section.** (page 92)

c. A voice is coming in but the unit switches to the FAX.

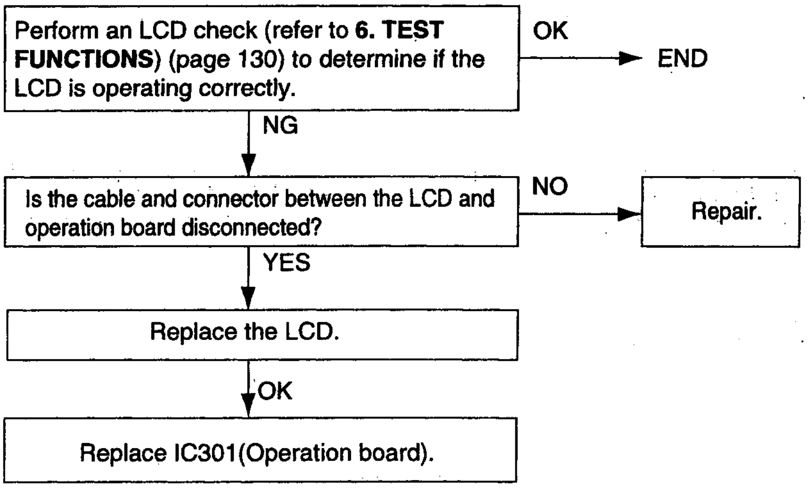
Check the VOX circuit and refer to 6.10.
TAM INTERFACE SECTION(page 208), or see
3.10.2 Analog Section.(page 92)

3.10.3 Operation Panel Section

1. No key operation


Do the keys remain pressed even when you do nothing? Perform a KEY CHECK. (Refer to **6. TEST FUNCTIONS**.) (page 130)
NG
Repair the keys.
OK
END
Keys occasionally don't work.
Check if CN802 (digital board) or H_CN3, H_CN1(H.V.P.S Board),E_CN5, E_CN8, (Engine board) CN307(operation board) is disconnected.
OK
Check the soldering of IC301 (Operation board).
NG
Repair CN307, H_CN3, H_CN1, E_CN5, E_CN8 and CN802.

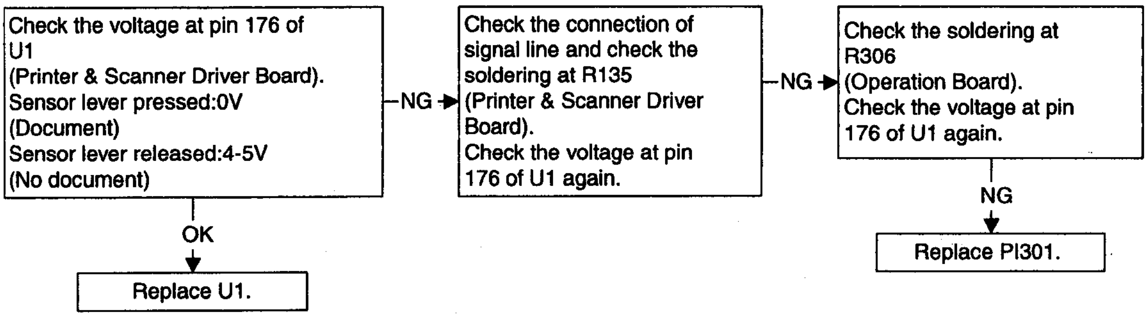
2. No LCD indication


Perform an LCD check (refer to **6. TEST FUNCTIONS**) (page 130) to determine if the LCD is operating correctly.
OK
END
NG
Is the cable and connector between the LCD and operation board disconnected?
NO
Repair.
YES
Replace the LCD.
OK
Replace IC301(Operation board).

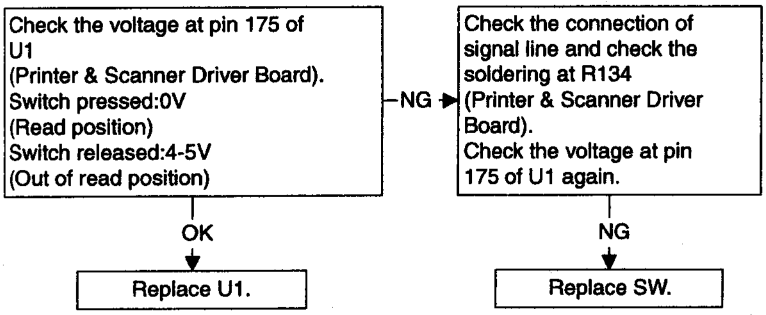
3.10.4 SENSOR SECTION(Refer to SENSORS AND SWITCHES for the circuit descriptions.)

Perform an SENSOR CHECK to determine if the sensoris operating correctly.

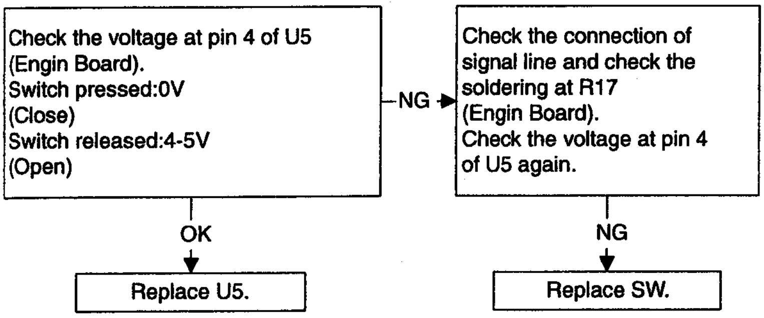
1) Check the document sensor.........."CHECK DOCUMENT"


Check the voltage at pin 176 of U1 (Printer & Scanner Driver Board). Sensor lever pressed:0V (Document) Sensor lever released:4-5V (No document)
NG
Check the connection of signal line and check the soldering at R135 (Printer & Scanner Driver Board). Check the voltage at pin 176 of U1 again.
NG
Check the soldering at R306 (Operation Board). Check the voltage at pin 176 of U1 again.
NG
Replace PI301.
OK
Replace U1.

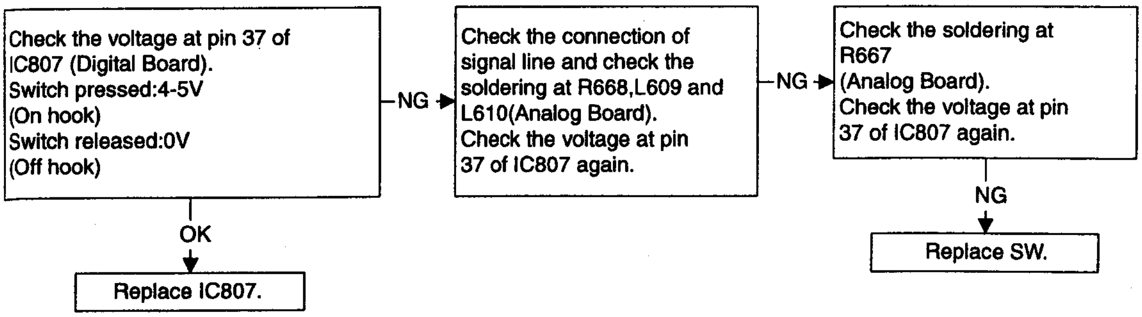
2) Check the paper feed switch.........."REMOVE DOCUMENT"


Check the voltage at pin 175 of U1 (Printer & Scanner Driver Board). Switch pressed:0V (Read position) Switch released:4-5V (Out of read position)
NG
Check the connection of signal line and check the soldering at R134 (Printer & Scanner Driver Board). Check the voltage at pin 175 of U1 again.
OK
Replace U1.
NG
Replace SW.

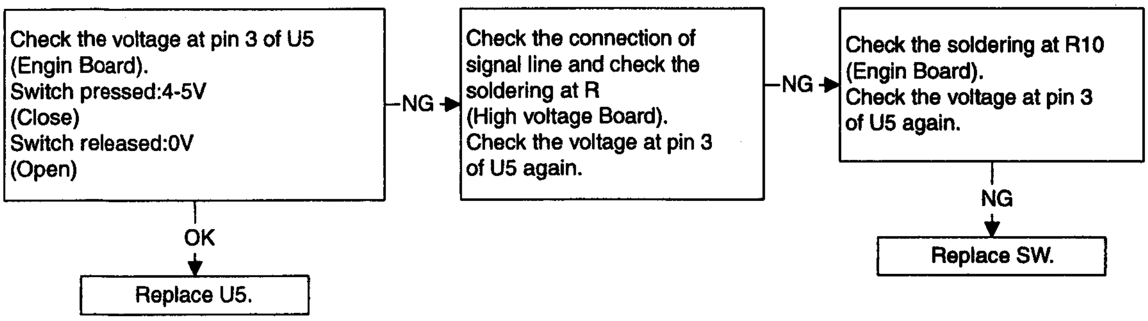
3) Check the scanner cover open sensor.........."PANEL OPEN"


Check the voltage at pin 4 of U5 (Engin Board). Switch pressed:0V (Close) Switch released:4-5V (Open)
NG
Check the connection of signal line and check the soldering at R17 (Engin Board). Check the voltage at pin 4 of U5 again.
OK
Replace U5.
NG
Replace SW.

4) Check the hook switch


Check the voltage at pin 37 of IC807 (Digital Board). Switch pressed:4-5V (On hook) Switch released:0V (Off hook)
NG
Check the connection of signal line and check the soldering at R668,L609 and L610(Analog Board). Check the voltage at pin 37 of IC807 again.
NG
Check the soldering at R667 (Analog Board). Check the voltage at pin 37 of IC807 again.
NG
Replace SW.
OK
Replace IC807.

5) Check the printer cover open sensor.........."TOP COVER OPEN"



Check the voltage at pin 3 of U5
(Engin Board).
Switch pressed:4-5V
(Close)
Switch released:0V
(Open)

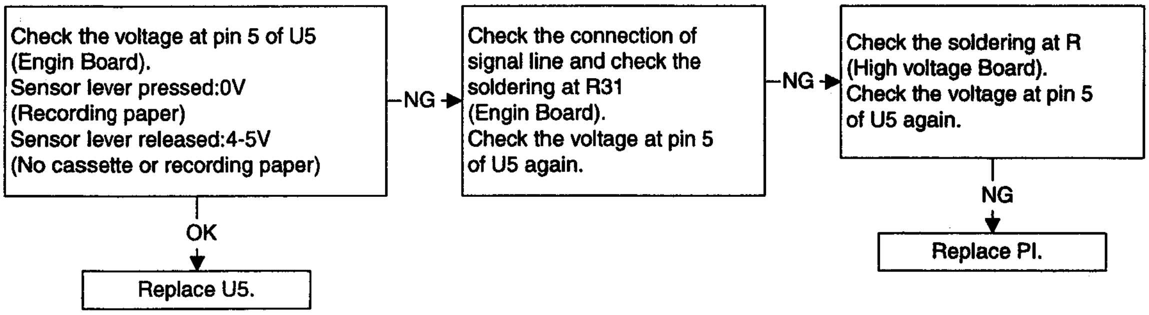
Check the connection of signal line and check the soldering at R
(High voltage Board).
Check the voltage at pin 3 of U5 again.

Check the soldering at R10
(Engin Board).
Check the voltage at pin 3 of U5 again.

Replace U5.

Replace SW.

6) Check the paper sensor.........."OUT OF PAPER"



Check the voltage at pin 5 of U5
(Engin Board).
Sensor lever pressed:0V
(Recording paper)
Sensor lever released:4-5V
(No cassette or recording paper)

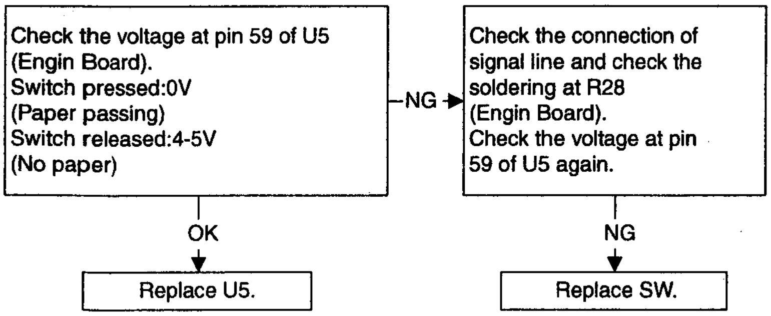
Check the connection of signal line and check the soldering at R31
(Engin Board).
Check the voltage at pin 5 of U5 again.

Check the soldering at R
(High voltage Board).
Check the voltage at pin 5 of U5 again.

Replace U5.

Replace PI.

7) Check the exit switch.........."PAPER JAMED"



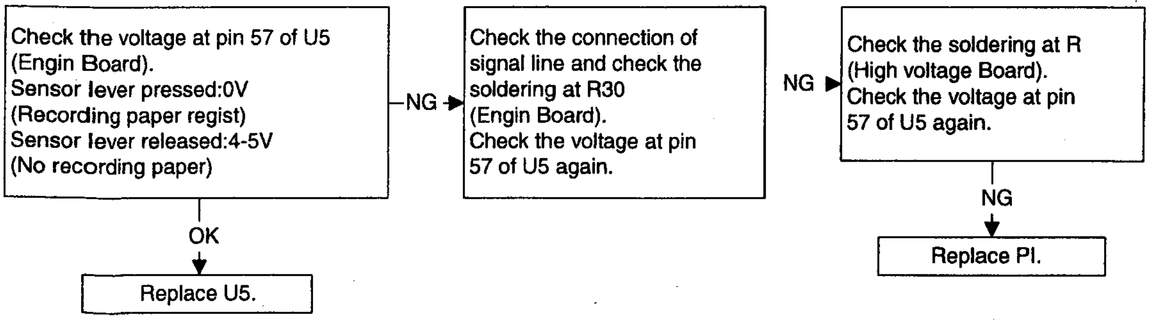
Check the voltage at pin 59 of U5
(Engin Board).
Switch pressed:0V
(Paper passing)
Switch released:4-5V
(No paper)

Check the connection of signal line and check the soldering at R28
(Engin Board).
Check the voltage at pin 59 of U5 again.

Replace U5.

Replace SW.

8) Check the regist sensor.........."FAILED PICKUP"



Check the voltage at pin 57 of U5
(Engin Board).
Sensor lever pressed:0V
(Recording paper regist)
Sensor lever released:4-5V
(No recording paper)

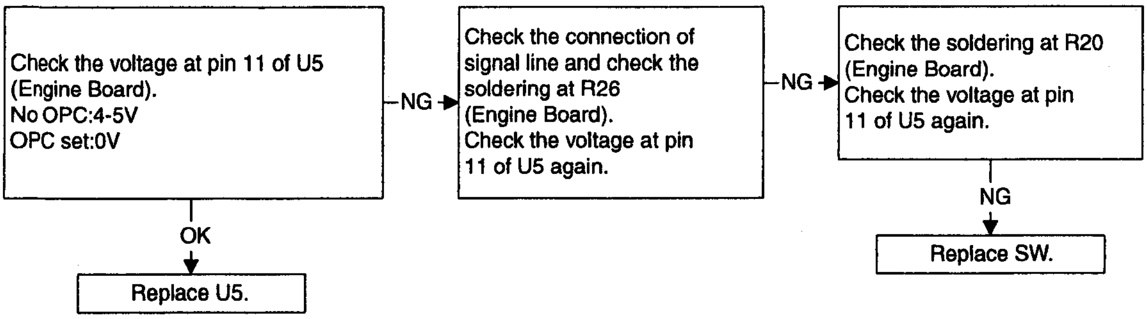
Check the connection of signal line and check the soldering at R30
(Engin Board).
Check the voltage at pin 57 of U5 again.

Check the soldering at R
(High voltage Board).
Check the voltage at pin 57 of U5 again.

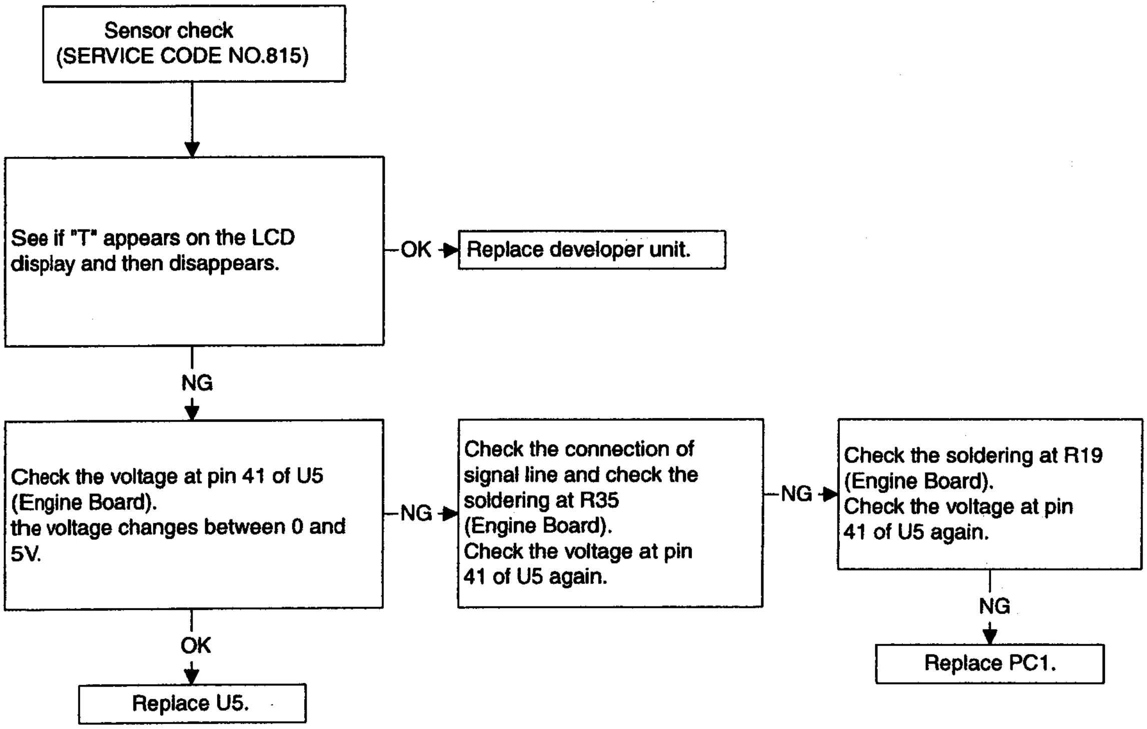
Replace U5.

Replace PI.

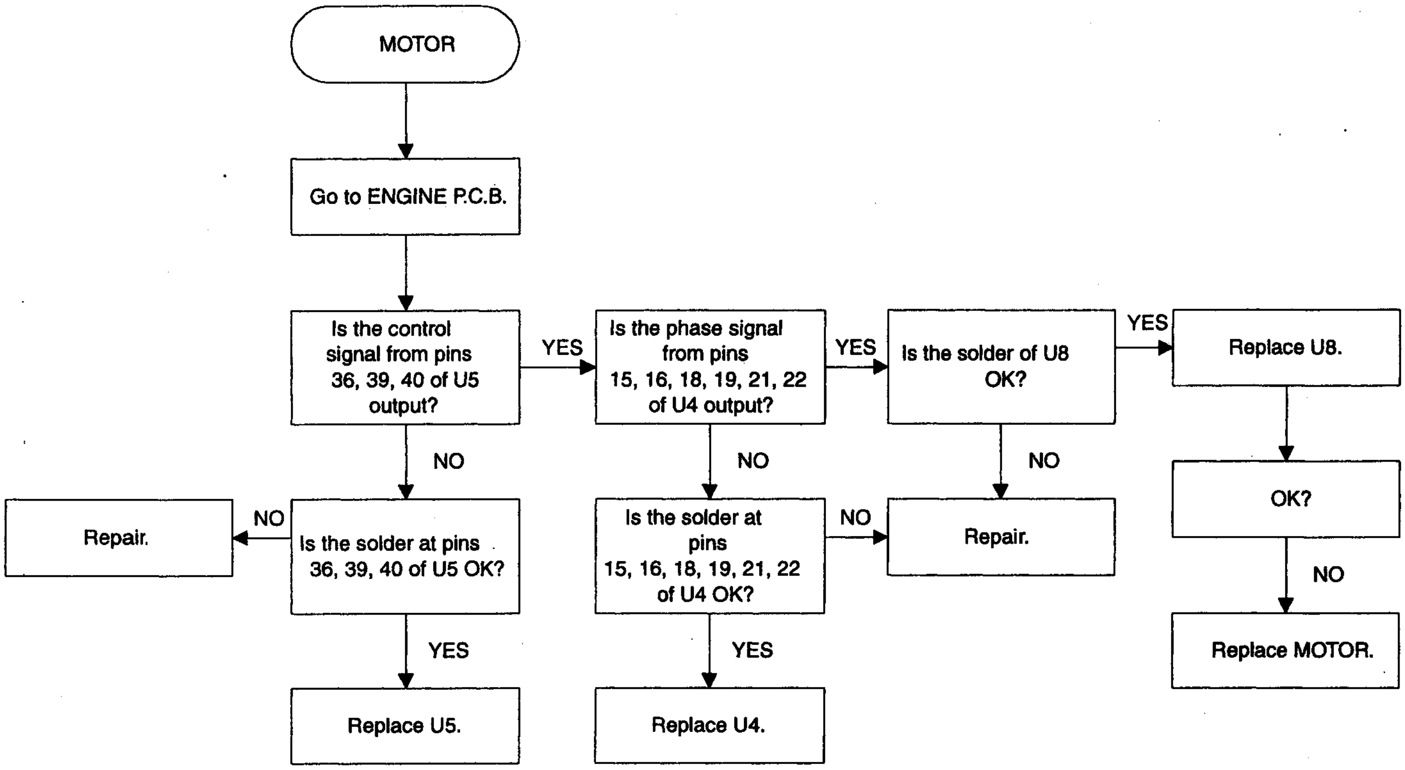
9) Check the OPC sensor.........."CHANGE DRUM","CHECK DRUM"


Check the voltage at pin 11 of U5
(Engine Board).
No OPC:4-5V
OPC set:0V
NG
Check the connection of signal line and check the soldering at R26 (Engine Board).
Check the voltage at pin 11 of U5 again.
NG
Check the soldering at R20 (Engine Board).
Check the voltage at pin 11 of U5 again.
NG
Replace SW.
OK
Replace U5.

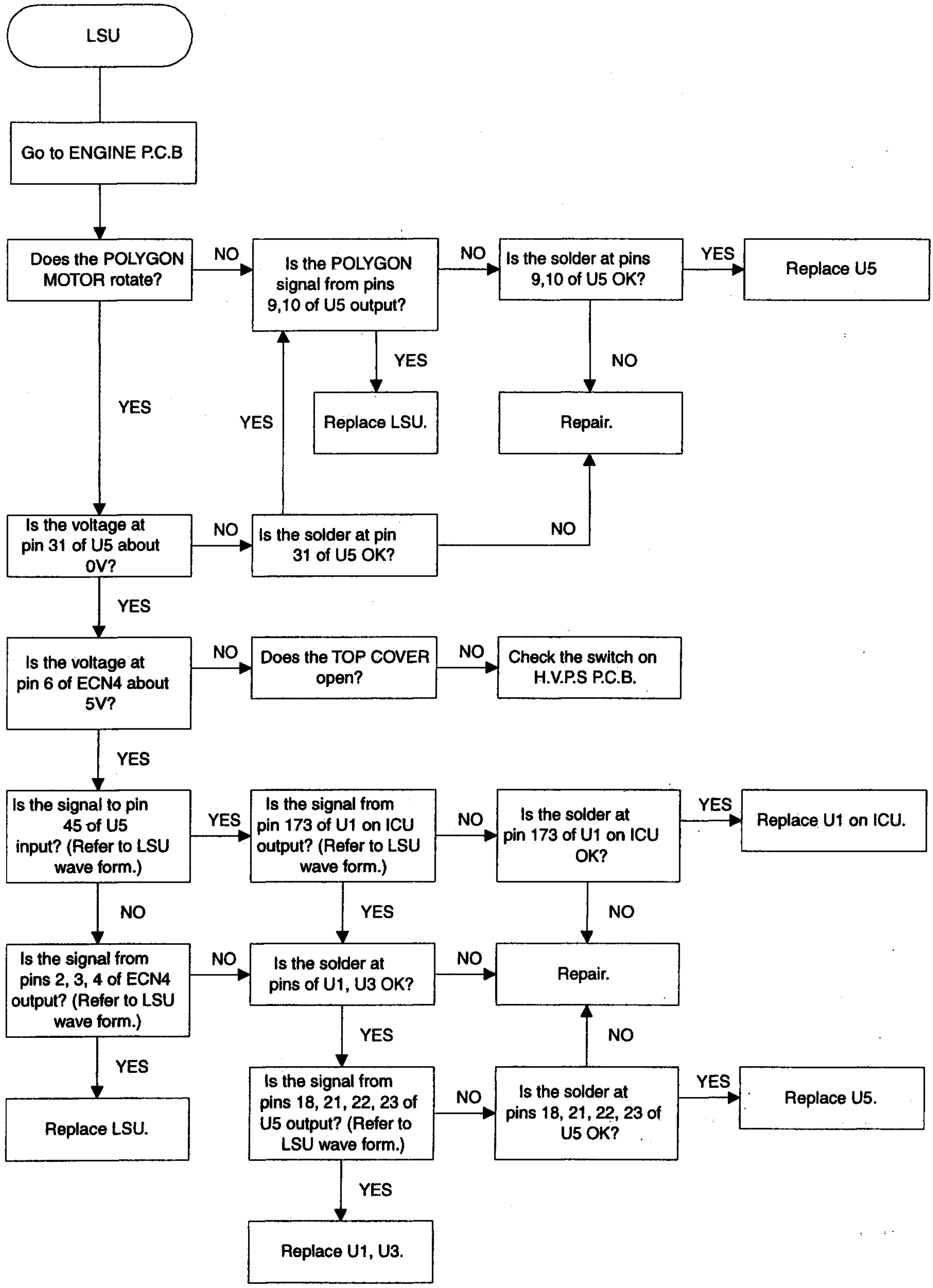
10) Check the toner sensor.........."TONER LOW","CHECK TONER"


Sensor check
(SERVICE CODE NO.815)
See if "T" appears on the LCD display and then disappears.
OK
Replace developer unit.
NG
Check the voltage at pin 41 of U5
(Engine Board).
the voltage changes between 0 and 5V.
NG
Check the connection of signal line and check the soldering at R35 (Engine Board).
Check the voltage at pin 41 of U5 again.
NG
Check the soldering at R19 (Engine Board).
Check the voltage at pin 41 of U5 again.
NG
Replace PC1.
OK
Replace U5.

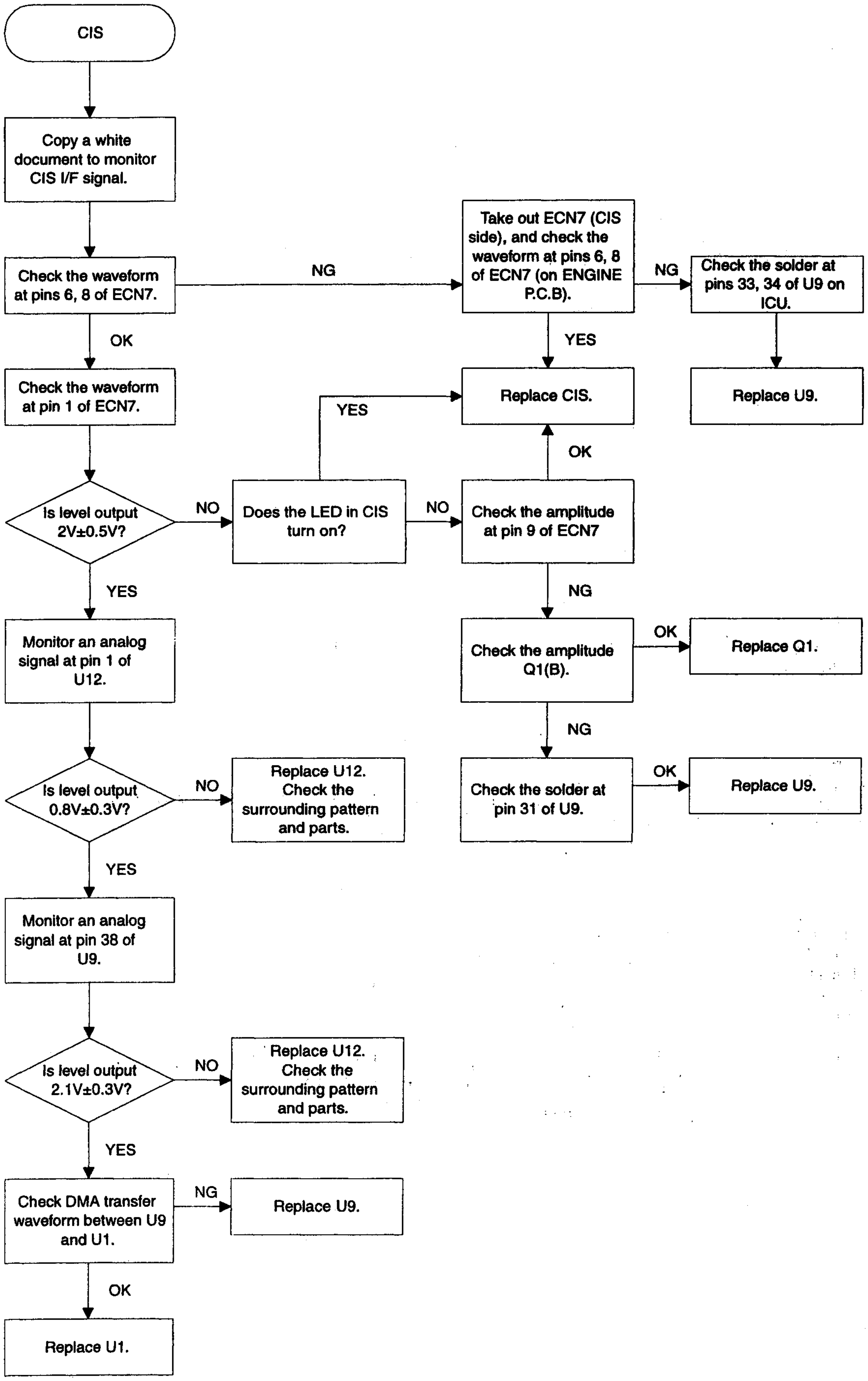
3.10.5 MOTOR SECTION


MOTOR
Go to ENGINE P.C.B.
Is the control signal from pins 36, 39, 40 of U5 output?
YES
Is the phase signal from pins 15, 16, 18, 19, 21, 22 of U4 output?
YES
Is the solder of U8 OK?
YES
Replace U8.
NO
NO
NO
Repair.
NO
Is the solder at pins 36, 39, 40 of U5 OK?
Is the solder at pins 15, 16, 18, 19, 21, 22 of U4 OK?
NO
Repair.
OK?
NO
Replace MOTOR.
YES
YES
Replace U5.
Replace U4.

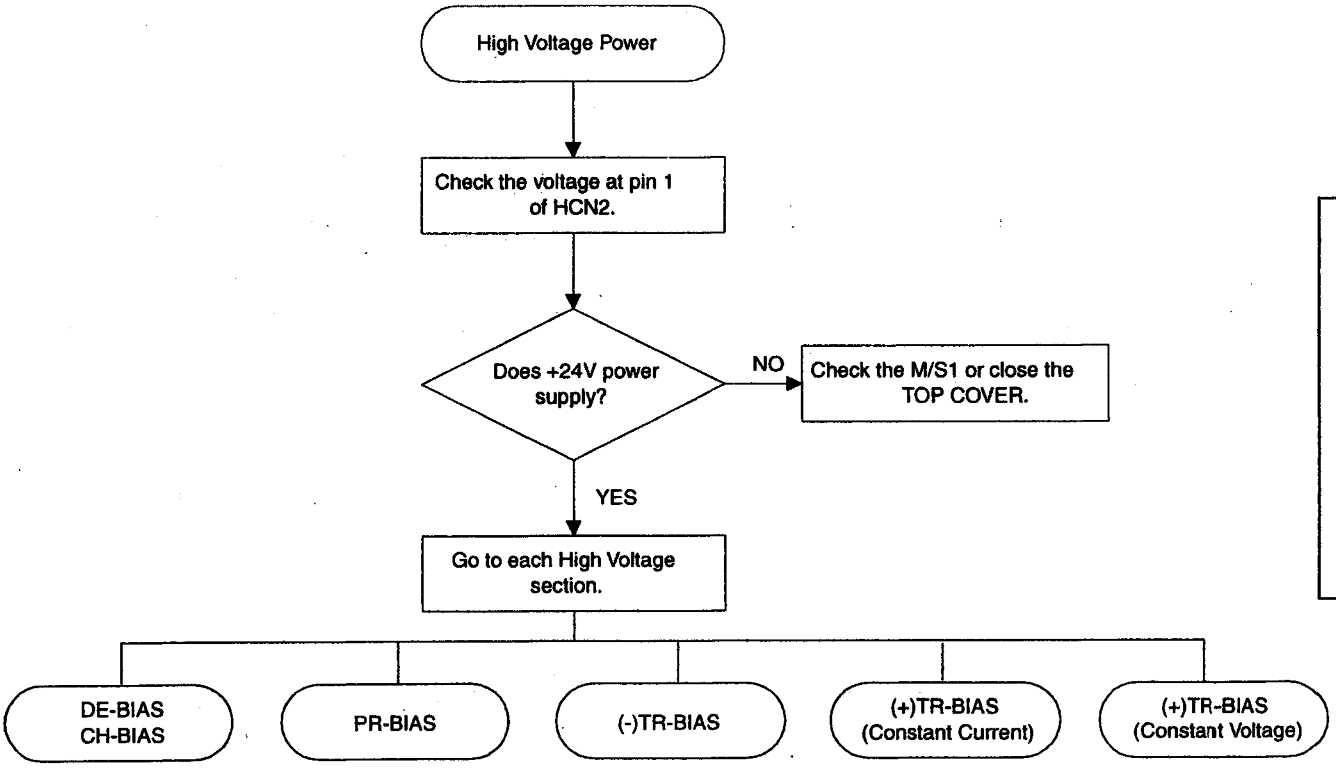
3.10.6 LSU SECTION

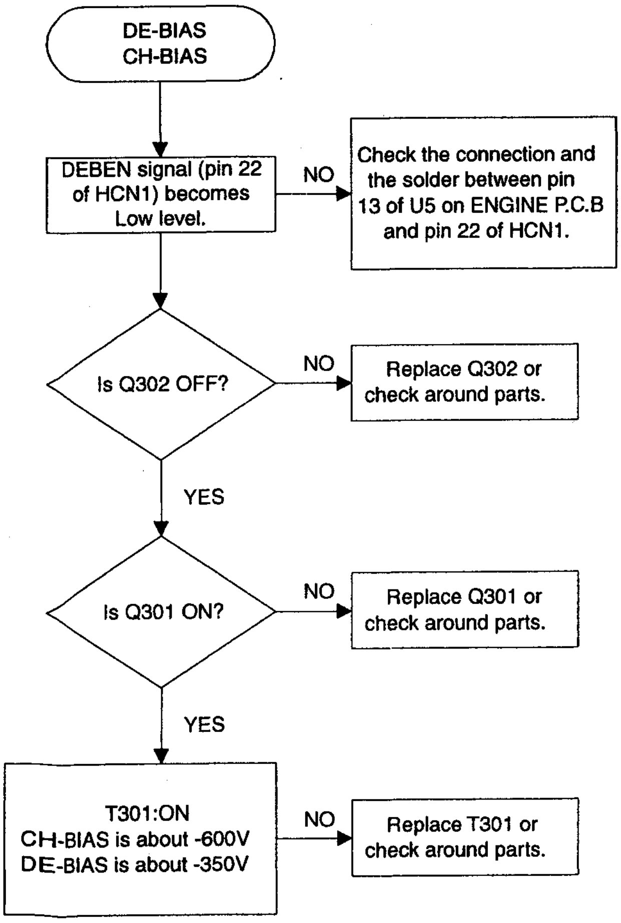

LSU
Go to ENGINE P.C.B
Does the POLYGON MOTOR rotate?
NO
Is the POLYGON signal from pins 9,10 of U5 output?
NO
Is the solder at pins 9,10 of U5 OK?
YES
Replace U5
YES
Replace LSU.
NO
Repair.
YES
YES
Is the voltage at pin 31 of U5 about 0V?
NO
Is the solder at pin 31 of U5 OK?
NO
YES
Is the voltage at pin 6 of ECN4 about 5V?
NO
Does the TOP COVER open?
NO
Check the switch on H.V.P.S P.C.B.
YES
Is the signal to pin 45 of U5 input? (Refer to LSU wave form.)
YES
Is the signal from pin 173 of U1 on ICU output? (Refer to LSU wave form.)
NO
Is the solder at pin 173 of U1 on ICU OK?
YES
Replace U1 on ICU.
NO
YES
NO
Is the signal from pins 2, 3, 4 of ECN4 output? (Refer to LSU wave form.)
NO
Is the solder at pins of U1, U3 OK?
NO
Repair.
YES
YES
NO
Replace LSU.
Is the signal from pins 18, 21, 22, 23 of U5 output? (Refer to LSU wave form.)
NO
Is the solder at pins 18, 21, 22, 23 of U5 OK?
YES
Replace U5.
YES
Replace U1, U3.

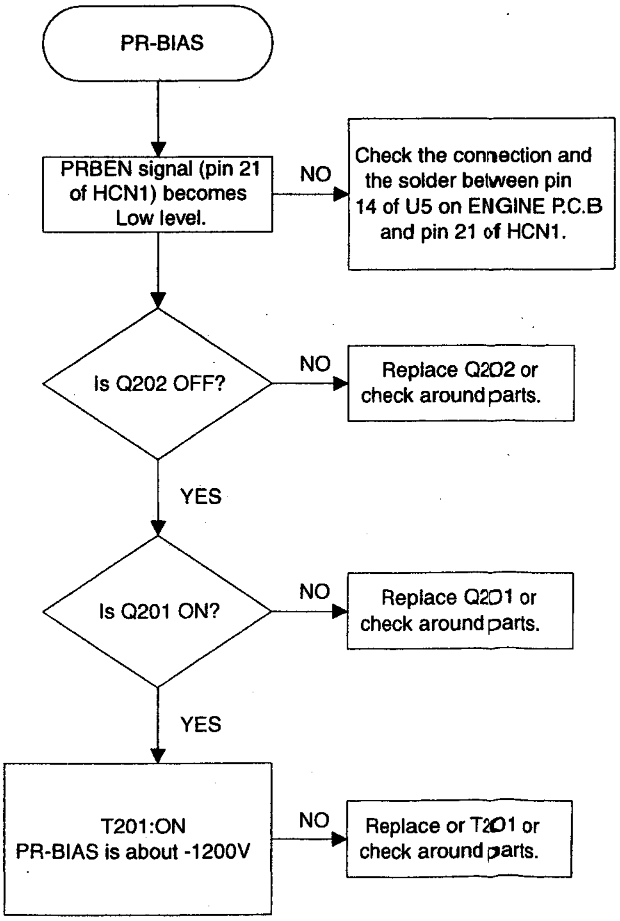
3.10.7 CONTACT IMAGE SENSOR SECTION

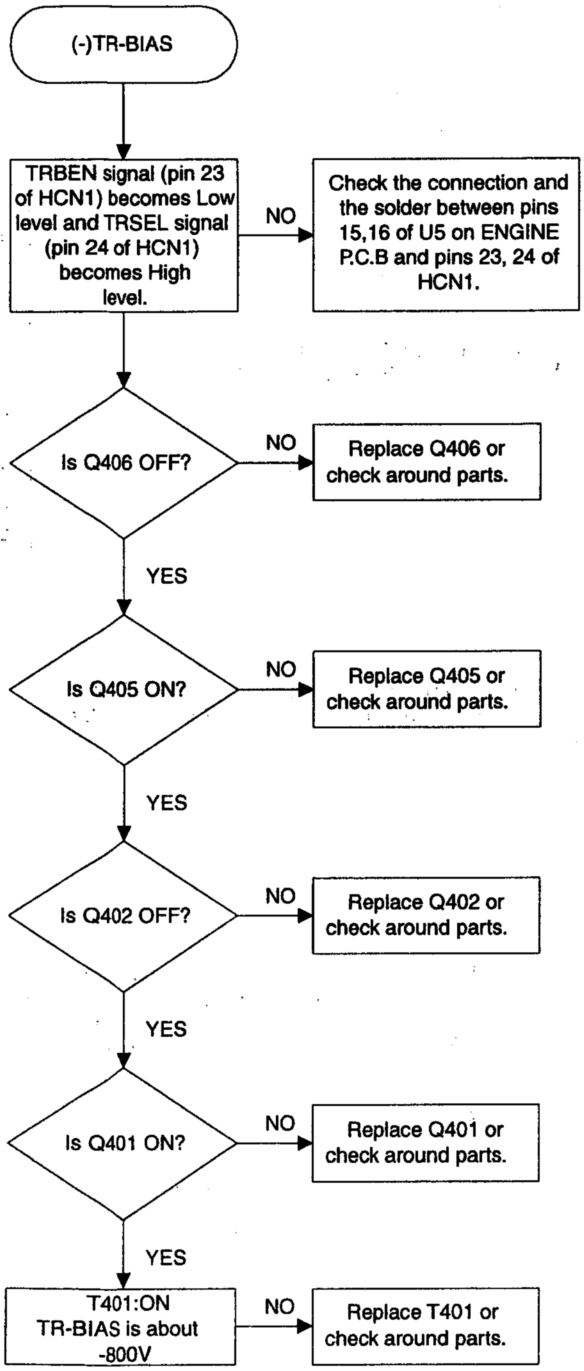

CIS
Copy a white document to monitor CIS I/F signal.
Check the waveform at pins 6, 8 of ECN7.
NG
Take out ECN7 (CIS side), and check the waveform at pins 6, 8 of ECN7 (on ENGINE P.C.B).
NG
Check the solder at pins 33, 34 of U9 on ICU.
Replace U9.
YES
OK
Check the waveform at pin 1 of ECN7.
Replace CIS.
YES
OK
Is level output 2V±0.5V?
NO
Does the LED in CIS turn on?
NO
Check the amplitude at pin 9 of ECN7
YES
NG
Monitor an analog signal at pin 1 of U12.
Check the amplitude Q1(B).
OK
Replace Q1.
NG
Is level output 0.8V±0.3V?
NO
Replace U12. Check the surrounding pattern and parts.
Check the solder at pin 31 of U9.
OK
Replace U9.
YES
Monitor an analog signal at pin 38 of U9.
Is level output 2.1V±0.3V?
NO
Replace U12. Check the surrounding pattern and parts.
YES
Check DMA transfer waveform between U9 and U1.
NG
Replace U9.
OK
Replace U1.

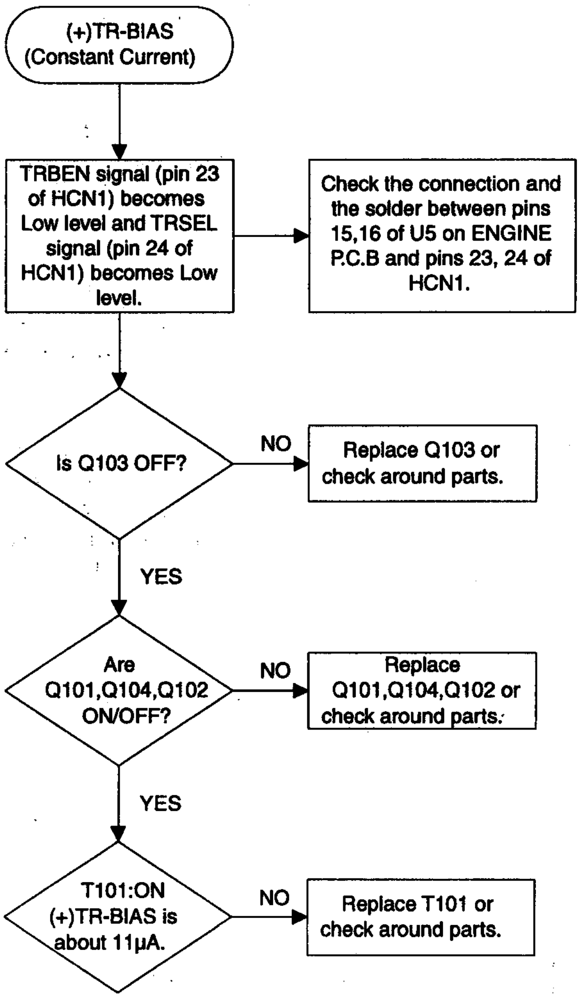
3.10.8 HIGH VOLTAGE POWER SUPPLY SECTION

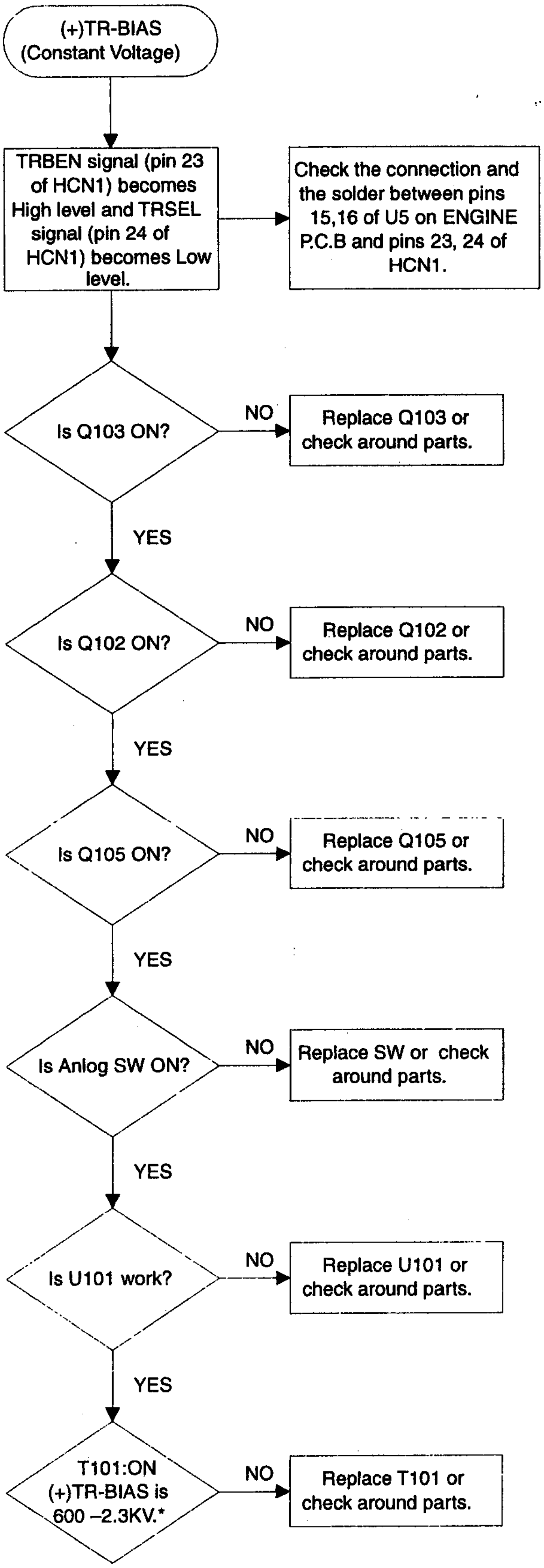

High Voltage Power
Check the voltage at pin 1 of HCN2.
Does +24V power supply?
NO
Check the M/S1 or close the TOP COVER.
YES
Go to each High Voltage section.
DE-BIAS CH-BIAS
PR-BIAS
(-)TR-BIAS
(+)TR-BIAS (Constant Current)
(+)TR-BIAS (Constant Voltage)


DE-BIAS CH-BIAS
DEBEN signal (pin 22 of HCN1) becomes Low level.
NO
Check the connection and the solder between pin 13 of U5 on ENGINE P.C.B and pin 22 of HCN1.
Is Q302 OFF?
NO
Replace Q302 or check around parts.
YES
Is Q301 ON?
NO
Replace Q301 or check around parts.
YES
T301:ON
CH-BIAS is about -600V
DE-BIAS is about -350V
NO
Replace T301 or check around parts.


PR-BIAS
PRBEN signal (pin 21 of HCN1) becomes Low level.
NO
Check the connection and the solder between pin 14 of U5 on ENGINE P.C.B and pin 21 of HCN1.
Is Q202 OFF?
NO
Replace Q202 or check around parts.
YES
Is Q201 ON?
NO
Replace Q201 or check around parts.
YES
T201:ON
PR-BIAS is about -1200V
NO
Replace or T201 or check around parts.


(-)TR-BIAS
TRBEN signal (pin 23 of HCN1) becomes Low level and TRSEL signal (pin 24 of HCN1) becomes High level.
NO
Check the connection and the solder between pins 15,16 of U5 on ENGINE P.C.B and pins 23, 24 of HCN1.
Is Q406 OFF?
NO
Replace Q406 or check around parts.
YES
Is Q405 ON?
NO
Replace Q405 or check around parts.
YES
Is Q402 OFF?
NO
Replace Q402 or check around parts.
YES
Is Q401 ON?
NO
Replace Q401 or check around parts.
YES
T401:ON TR-BIAS is about -800V
NO
Replace T401 or check around parts.

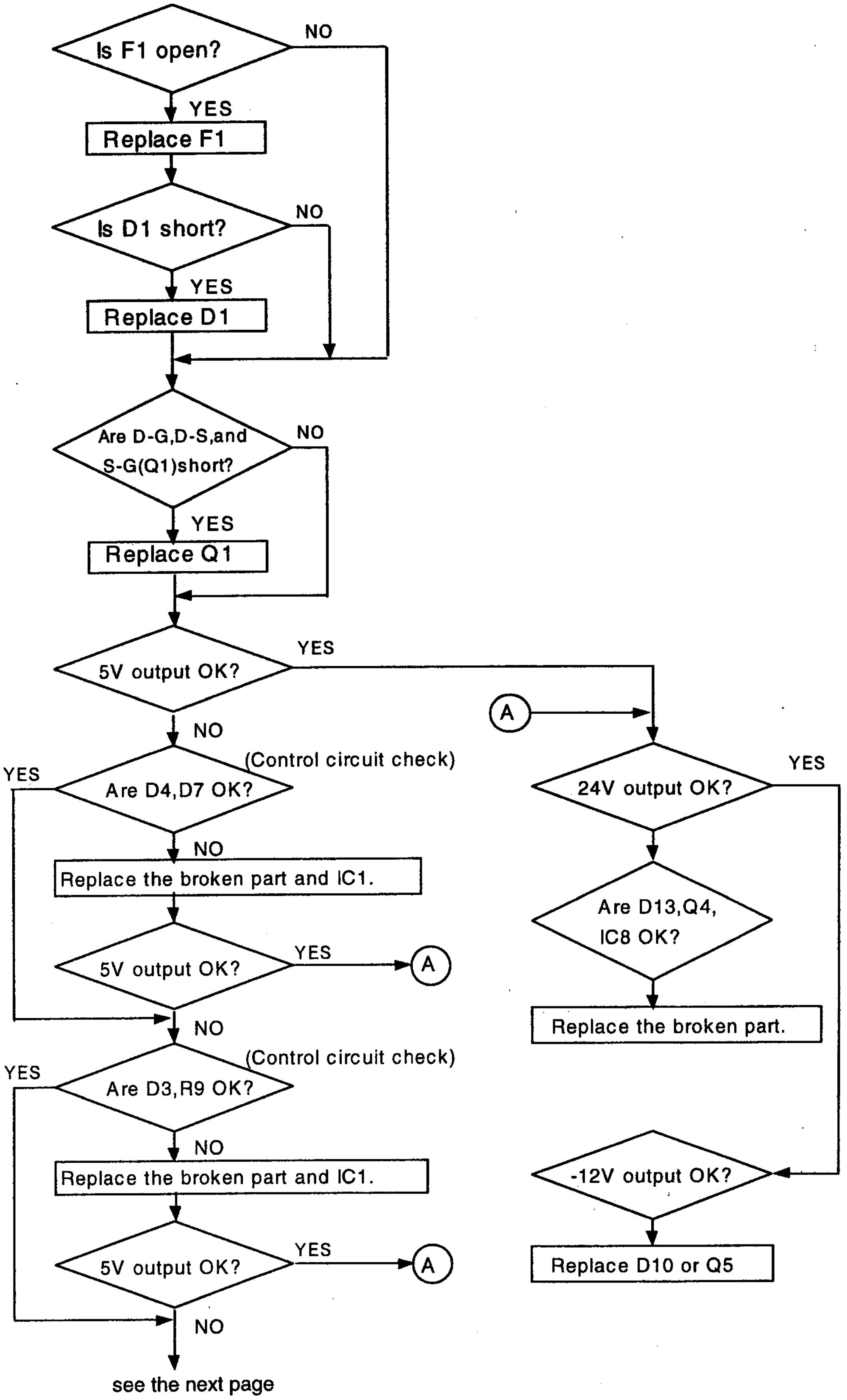

(+)TR-BIAS (Constant Current)
TRBEN signal (pin 23 of HCN1) becomes Low level and TRSEL signal (pin 24 of HCN1) becomes Low level.
Check the connection and the solder between pins 15,16 of U5 on ENGINE P.C.B and pins 23, 24 of HCN1.
Is Q103 OFF?
NO
Replace Q103 or check around parts.
YES
Are Q101,Q104,Q102 ON/OFF?
NO
Replace Q101,Q104,Q102 or check around parts.
YES
T101:ON (+)TR-BIAS is about 11µA.
NO
Replace T101 or check around parts.

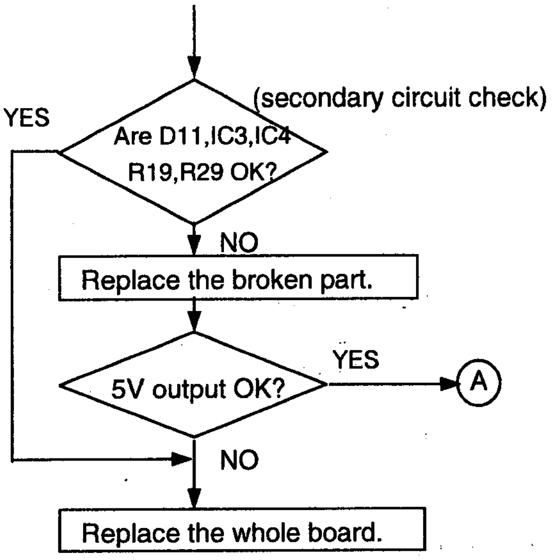

(+)TR-BIAS (Constant Voltage)
TRBEN signal (pin 23 of HCN1) becomes High level and TRSEL signal (pin 24 of HCN1) becomes Low level.
Check the connection and the solder between pins 15,16 of U5 on ENGINE P.C.B and pins 23, 24 of HCN1.
Is Q103 ON?
NO
Replace Q103 or check around parts.
YES
Is Q102 ON?
NO
Replace Q102 or check around parts.
YES
Is Q105 ON?
NO
Replace Q105 or check around parts.
YES
Is Anlog SW ON?
NO
Replace SW or check around parts.
YES
Is U101 work?
NO
Replace U101 or check around parts.
YES
T101:ON (+)TR-BIAS is 600 –2.3KV.*
NO
Replace T101 or check around parts.

* This voltage changes according to paper size, environment and so on.

3.10.9 SMPS SECTION

Our recommendation For Troubleshooting is as follows.
This procedure comes from our experience of troubleshooting in our lab.
* Before turnig on the power supply ,you shoud check F1.


Is F1 open?
NO
YES
Replace F1
Is D1 short?
NO
YES
Replace D1
Are D-G,D-S,and S-G(Q1)short?
NO
YES
Replace Q1
5V output OK?
YES
NO
(Control circuit check)
YES
Are D4,D7 OK?
NO
Replace the broken part and IC1.
5V output OK?
YES
A
NO
(Control circuit check)
YES
Are D3,R9 OK?
NO
Replace the broken part and IC1.
5V output OK?
YES
A
NO
see the next page
A
24V output OK?
YES
Are D13,Q4, IC8 OK?
Replace the broken part.
-12V output OK?
Replace D10 or Q5


(secondary circuit check)
Are D11,IC3,IC4
R19,R29 OK?
YES
NO
Replace the broken part.
5V output OK?
YES
A
NO
Replace the whole board.

4. PANA LINK

① List of PANA LINK and help instructions

To obtain information about the Multi-Function Center applications, use the help function.
For help, follow these steps.

For Windows 95 Users:

1. Click the **Start** button.
2. Click **Programs.**
3. Click **PANA LINK.**
4. Click **PANA LINK HELP.**
5. Click **Index** or **Contents** and choose the subject you need help with.

FUNCTIONS OF THE MULTI-FUNCTION CENTER APPLICATIONS

Applications	Functions
PANA LINK	*Introduction* Hardware requirements for PANA LINK About Install/Uninstall PANA LINK Printer Driver How to Start and Exit PANA LINK About the PANA LINK Main Panel A List of the Shortcut Keys
PRINT	Printing from a file Checking the printing status
transmit the facsimile from the personal	About the Send a Fax panel Transmit an image file How to send a fax from a printed page Cover page Save and print of the transmission data How to make a peculiar transmission Quick transmission Sending to several people in one operation (Broadcast) Sending at a certain time Sending several documents together The Advanced dialog
receive a facsimile with the personal	Receiving a facsimile New fax notification How to make a peculiar transmission Forward the received facsimile automatically Forward the received facsimile as an e-mail message Stamp the received date (Time/Date stamp)
make a phone call	Make a phone call How to set the telephone number Dialing the telephone number manually Dial using the One-Touch keys Dial using the Address Book Dial the same person again
scan	How to scan Image quality Image Type Brightness
copy	How to copy Enlarge and reduce

Applications	Functions
Communication Log	About the Communication Log About the Sent Log About the Received Log About the Outbox Save the log Print the log Display the image of the facsimile document Send the log as an e-mail message Resend Change the destination of an unsent fax Forward Delete Change a log subject Find About the Find dialog box Sort Menu list
Address Book	About Address Book How to edit the data of the partners How to add a new entry How to change How to delete How to edit the Address Book How to create a new Address Book How to change the name of the Address book How to delete an Address Book How to change the Address Book How to edit the distribution group How to create a group How to change the group name How to delete a group How to add members to a group How to change groups How to select the number Sending a phone or fax number from the Address Book to the PANA LINK Main Panel How to move and copy Move and copy Other functions Find Sorting Simple print of the Address Book Print the Address Book in detail form Import and export the Address Book Save the Address Book Menu list
Viewer	Shortcut keys About the Viewer Setup Setup Line setup Transmission setup Reception setup System setup
One-touch	User Information Cover Page One-touch keys How to register and change an entry How to delete an entry
Troubleshooting	Common problems Problems with transmission Problems with reception Problems with scan and copy Problems about the display of errors ECP problems

4.1 Problems with PC software

1)-1 General

PROBLEM	CAUSE & REMEDY
I do not know how to move the PANA LINK Main Panel, because there is no title bar.	• Point at an area with no buttons or parts and drag it where you want to move.
I do not know whether the PANA LINK Main Panel is active or not.	• The brightness of the Main Panel Display shows you whether the PANA LINK Main Panel is active or not. <Active - bright, Non active - dark>
A quick tip does not appear when I hold the mouse pointer over a button in the PANA LINK Main Panel, although I have set to display this.	• If the PANA LINK Main Panel is non-active, the quick tip does not appear. Confirm again, after making the PANA LINK Main Panel active, by clicking anywhere on it.
The telephone number set in the Main Panel Display disappears, and the display shows, "It is used for specifying the dial data.", explanation of the button and so on.	• The quick tip is displayed. Move the mouse cursor out of the PANA LINK Main Panel. If you do not need quick tips, open the setup dialogue and select OFF of the Quick Tip in the System tab.
The PANA LINK Main Panel disappears.	• Look in the task tray (in the task bar). If you do not find the PANA LINK icon, it is closed. If you find the icon, the PANA LINK Main Panel is just minimized or iconified. Double-click the icon in the task tray or open the menu by right-clicking the fax icon then select Restore.
The PANA LINK Main Panel disappears just after initializing.	• The PANA LINK Main Panel is set to minimize when PANA LINK starts. Double-click the icon in the task tray or open the menu by right-clicking the fax icon, then select Restore. If you do not want this to happen each time you start PANA LINK, press the Setup button in the PANA LINK Main Panel, and check off the Start minimized check box in the Program startup settings in the System tab.
I want to delete all of the telephone numbers set in the Main Panel Display.	• Press the Stop button.
I cannot recognize the last part of the entry in the address list of the Address Book or Communication log, because that part ended with... .	• Put a cursor on the line between the buttons, the cursor changes shape and you can expand the area by dragging, or double-clicking.
A cover page is sent whenever I send a fax, though I do not want to send it.	• The setting of the cover page is ON by default. To deactivate the setting, open the Setup dialogue by pressing the Setup button, and click the Default cover page at every transmission check box in the Cover page tab.
I attempted to select a telephone number from the Address Book to the PANA LINK Main Panel, but I selected a fax number by mistake.	• You can change your selection in the PANA LINK Main Panel. Double click the number you set in the Main Panel Display, the fax number switches into the telephone number. You can also right-click the entry to select a specific number.
I cannot use the Dial button, even though I specified a telephone number.	• If there is transmission data or a document is set in the fax, you can only use the fax transmission function. If you want to make a phone call, please delete the transmission data.
When I exit PANA LINK, the Viewer does not close.	• The viewer can be operated separately, so when the PANA LINK is closed, it remains open.

1)-2 General (cont.)

PROBLEM	CAUSE & REMEDY
The PANA LINK does not work properly.	• Click the ☒ button to exit PANA LINK, and restart. If PANA LINK does not closed, please force it to close by pressing Ctrl+Alt+Delete keys.
I cannot send or receive a fax through PANA LINK.	• **When you use a PC with an ECP printer port such as a Compaq Deskpro or an IBM Aptiva, you may need to change the ECP port into a standard port:** 1. Click the **Start** button, point the **Settings**, then **Control Panel.** 2. Double-click **System.** 3. Double-click **Ports [COM&LPT]** from the **Device Manager** tab. 4. Double-click **ECP Printer Port (LPT1).** 5. Click the **Update Driver...** button on the Driver tab. –The Update Device Driver Wizard starts. 6. Click the **"NO, select driver from list"** button. 7. Click **Show all hardware** and choose Standard Port types from the **Manufacturers** list, and Printer Port from **Models.** 8. Click the **Finish** button. If you are required to insert the Windows 95/98 CD-ROM, please do the following. 1) Insert the Windows 95/98 CD-ROM. The Copying files dialogue box appears. 2) Click the **Browse** button, and then choose Win95/98 folder from the list. 3) Click the **OK** button. The Version Conflict dialogue box appears. Please check Your version here. If it is 4.00.955, click **Yes.** You may need to change the ECP port in the BIOS system settings. It varies by PC, please refer to your PC operating instructions or manufacturer for instructions. Please verify the LPT.VXD version is 4.00.955: 1) Click the **Start** button, point to **Settings**, then **Control Panel.** 2) Double-click **System**, and then open the **Device Manager** tab. 3) Double-click **Ports [COM&LPT]** from the **Device Manager** tab. 4) Double-click **Printer Port (LPT1).** 5) Click the **Driver** tab. Verify whether the File version is 4.00.955. **Note:** If it is an old version, you must uninstall PANA LINK first, then reboot the PC, and re-install it again.
I cannot open a TIFF file.	• You must change the compression format of the file. For example, to convert an image using WANG Imaging, proceed as follows: 1. Click on the **Start** button, point to **Programs – Accessories,** then click **Imaging.** 2. Open the TIFF file that you cannot open in the PANA Viewer. 3. Open the **Page** menu, then click **Convert.** –The Convert dialogue box appears. 4. Click the **Compression** tab, then choose [CCITT Group 3 (1d) Modified Huffman] from the **Compression** drop-down list. 5. Click the **OK** button. –The file's compression format is changed.

2) Printing

PROBLEM	CAUSE & REMEDY
I cannot print.	• Please verify the following. **1.** Driver settings:If you change the driver settings in the Panasonic KX-FLM600/650 dialogue box, you may be able to print. **2.** Preview window:If the image is not properly displayed in the Preview window, your file may contain errors. Try printing a different file. Also, there may be a problem with the application you are using. **3.** Bad connection between PC and printer: Verify the printer is properly connected and plugged in. **4.** Re-install: Uninstall PANA LINK, reboot your PC, then re-install it. **5.** Port setting: If the printer port is not set to FLM600, you cannot print. 1) Click the **Start** button, point to **Settings**, then **Printer**. 2) Choose **Properties** from the printer's pop-up menu. –The Properties dialogue box appears. 3) Click the **Details** tab, and check the **Print to the following port** drop down list box. If a different port is selected, re-select FLM600 (KX-FLM600 port). 4) Click the **OK** button. **6.** Bi-Directional Parallel Port. (ECP mode):If using ECP (Extended Capability Port) mode, you may not be able to print. Please change it into a standard port: 1) Click the **Start** button, point to **Settings**, then **Control Panel**. 2) Double-click **System**, and then open the **Device Manager** tab. 3) Double-click **Ports [COM&LPT]** from the **Device Manager** tab. 4) Double-click the **ECP Printer Port**. 5) Click the **Update Driver...** button from the Driver tab. 6) Change the ECP port into Printer Port (LPT1). If the same error occurs repeatedly even after changing the printer port, check the BIOS settings or update LPT.VXD. Please refer your computer manufacturer for the latest LPT.VXD and the BIOS settings. LPT.VXD version 4.00.955 is required. If you do not use the correct version, we cannot guarantee that the driver will work properly. Reboot your PC, and try to test printing. 1) Click the **Start** button, point to **Settings**, then **Printers**. 2) Choose **Properties** from the printer's pop-up menu. –The Properties dialogue box appears. 3) Click the **Print Test Page** button from the **General** tab. If the same error occurs, please see next. Please verify the LPT.VXD version is 4.00.955: 1) Click the **Start** button, point to **Settings**, then **Control Panel**. 2) Double-click **System**, and then open the **System Properties** dialogue box. 3) Double-click **Ports [COM&LPT]** from the **Device Manager** tab. 4) Double-click **Printer Port (LPT1)**. 5) Click the Driver tab. Verify whether the File version is 4.00.955. **Note:**If it is an old version, you must uninstall PANA LINK first, and then restart the PC, and re-install it again. When you change settings manually, you must reboot your PC.

3) Transmission

PROBLEM	CAUSE & REMEDY
I see a "Sending the fax ended in failure." message.	• Possible causes are as follows. –Telephone circuit is not good. –You received a call-waiting signal. –The other party stopped reception. –The other party ran out of the recording paper. Transmit again after confirming with the other party.
I see a "No response" message.	• The other party did not answer the call or the line was busy. Transmit again after waiting a while. • The dialing mode setting (tone or pulse) is not correct. Open the Setup dialogue box and confirm the dialing mode setup check box in the Line tab.
I cannot make an international transmission.	• Set the fax machine to the overseas transmission mode.

4) Reception

PROBLEM	CAUSE & REMEDY
The fax machine receives a fax, but I want to receive it with the PC.	• You probably checked the [Receive directly to Facsimile Unit] check box to activate in the Reception tab in the Setup dialogue box. If so, click this check box to deactivate. • The setting of the PC LINK on the fax machine is off. Turn it on. • The PANA LINK application does not operate. Start the PANA LINK application.
The PC receives a fax, but I want to receive it with the fax machine.	• Open the Setup dialogue box, then check the [Receive directly to Facsimile Unit] check box to activate in the Reception tab.
I want to print out the received fax with another printer.	• Print after selecting the desired printer from the Print dialogue box.
The "Fax reception ended in failure." message is displayed.	• Possible causes are as follows. –The line condition was not good. –The reception was interfered with the call waiting signal. Check with the other party and try again.

5) Scan and copy

PROBLEM	CAUSE & REMEDY
I cannot SCAN.	• The facsimile unit is probably busy. Try again after the other. operation is completed. • There might not be enough free space on the hard disk. Try again after deleting unnecessary files or closing unused applications. • There might not be enough RAM: Try again after closing some application. • Restart the PC, then try again.
The document is not pulled into the document feeder.	• Confirm that a maximum of 15 pages are set correctly.
A document is jammed.	• If you select Fine (200×200 dpi) in the image quality list, make sure the document is less than 655 mm (25 7/8"). If you select Line Art (400×400 dpi), make sure the document is less than 470 mm (18 1/2"). Remove the jammed document and try it again.
The recrding paper is jammed.	• Remove the jammed recrding paper, reinsert it, then try again.
Even after clicking the Cancel button, scanning continues.	• Please wait. Somtimes, it takes a while for the cancel request to be accepted.
I cannot scan documents using other applications.	• Due to compatibilty issues, an error may occur when you scan documents using certain applications. Scan from PANA LINK.

6) Error message

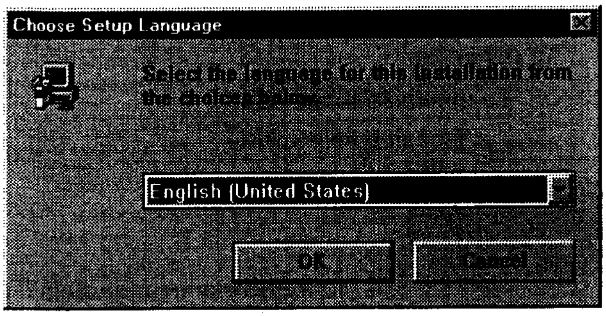
PROBLEM	CAUSE & REMEDY
"Initializing ended failure" is displayed.	• Reconfirm the connection of the PC and the fax machine. • The setting of the PC LINK on the fax machine is off. Turn it on.

4.2 INSTALLING THE PANA LINK SOFTWARE

1 Start Windows 95 or Windows 98 and close all applications.

2 Insert the included CD into your CD-ROM drive.

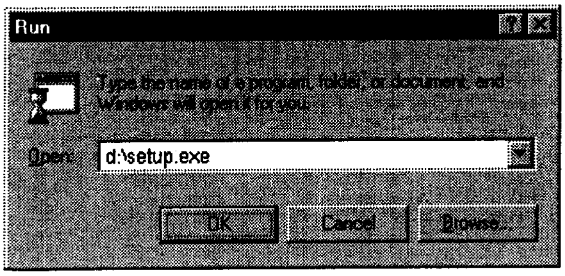
- The language dialog box will appear.
  Select the desired language that you use with this software. Then click [OK].



Select the language for this installation from the choices below.

English (United States)

- If the language dialog box does not appear:
  The installation will automatically start.
- If the language dialog box does not appear and the installation does not start automatically:
  Click **Start**, choose **Run...** . Type "**d:\setup**" (where **d:** is the drive letter of your CD-ROM drive). Click **OK**.
  (If you are not sure what the drive letter is for your CD-ROM drive, please use Windows Explorer and look for the CD-ROM drive.)



Type the name of a program, folder, or document, and Windows will open it for you.

Open: d:\setup.exe

3 The installation will automatically start.

4 Follow the instructions on the screen until all files have been installed.

5 Be sure to read a README file for more information.

Note:
For detailed instructions on PANA LINK software, use the Help function.
The screens shown in these instructions are from Windows 95.

Windows 3.1 or 3.11 users:

- If you are using Windows 3.1 or 3.11, follow these steps to install the software.

1. From the Program Manager, click **File**, choose **Run...** .
2. Type "**d:\setup**" (where **d:** is the drive letter of your CD-ROM drive).
3. Click **OK**.

- The printer driver only is available. Please read a README file (README.WRI) in the CD-ROM for more information.

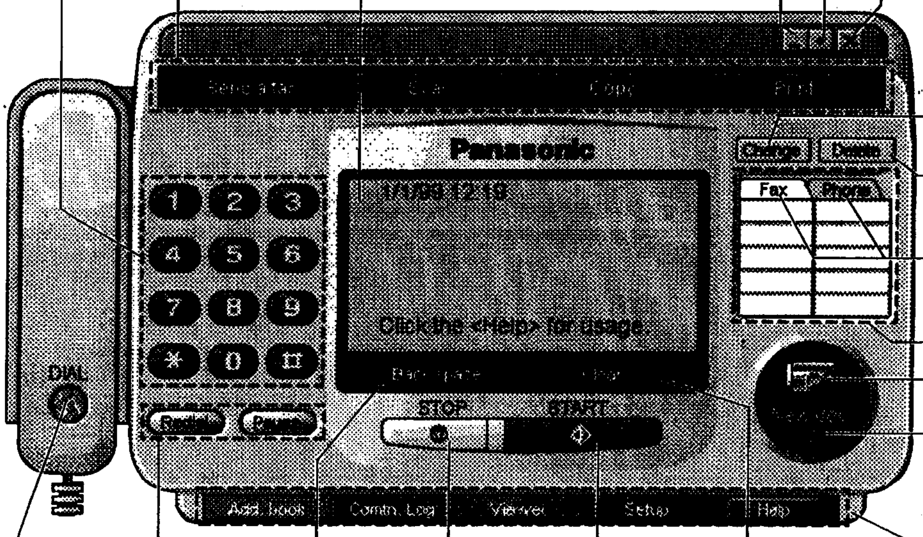
4.3 ACTIVATING THE PANA LINK SOFTWARE

1 Click **Start**.

2 Point to **Programs**, point to PANA LINK and click **PANA LINK**.

- The PANA LINK main panel will appear.

Send a fax	**Scan**	**Copy**	**Print**
To send a file created on the PC.	To create an image file by scanning the document set in the fax machine.	To make a copy of the document set in the fax machine.	To print a file created on the PC.


Send a fax
Scan
Copy
Print
Panasonic
1/1/99 12:18
Click the <Help> for usage.
Change
Delete
Fax
Phone
Backspace
Clear
STOP
START
Redial
Pause
DIAL
Add. book
Comtn. Log
Viewer
Setup
Help

Dial keypad

Display

To minimize.

To minimize to an icon.

To exit PANA LINK.

To register or change data in the one-touch memory.

To delete the data in the one-touch memory.

To switch On-touch page.

One-touch dial

Reception icon

Displays the number of the received documents which have not been viewed yet.

To make a phone call.

To delete one figure of a telephone number.

To start fax transmission or reception.

To stop fax transmission or reception.

To delete a selected telephone number.

Redial	To redial the last number dialed.
Pause	To insert (a) pause(s) in the telephone number.

Add. book	**Comtn. Log**	**Viewer**	**Setup**	**Help**
To store and view information in your address book.	To display the record of transmitted/received facsimile documents and manage the documents waiting to be sent.	To display an image sent or received with PANA LINK.	To set PANA LINK options.	For detailed instructions on PANA LINK software.

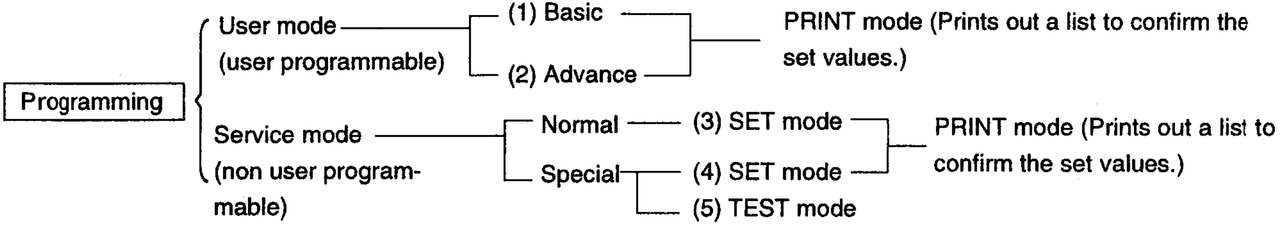
5. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the unit, and to test the unit.
This facilitates communication between the user and the service man while programming the unit.

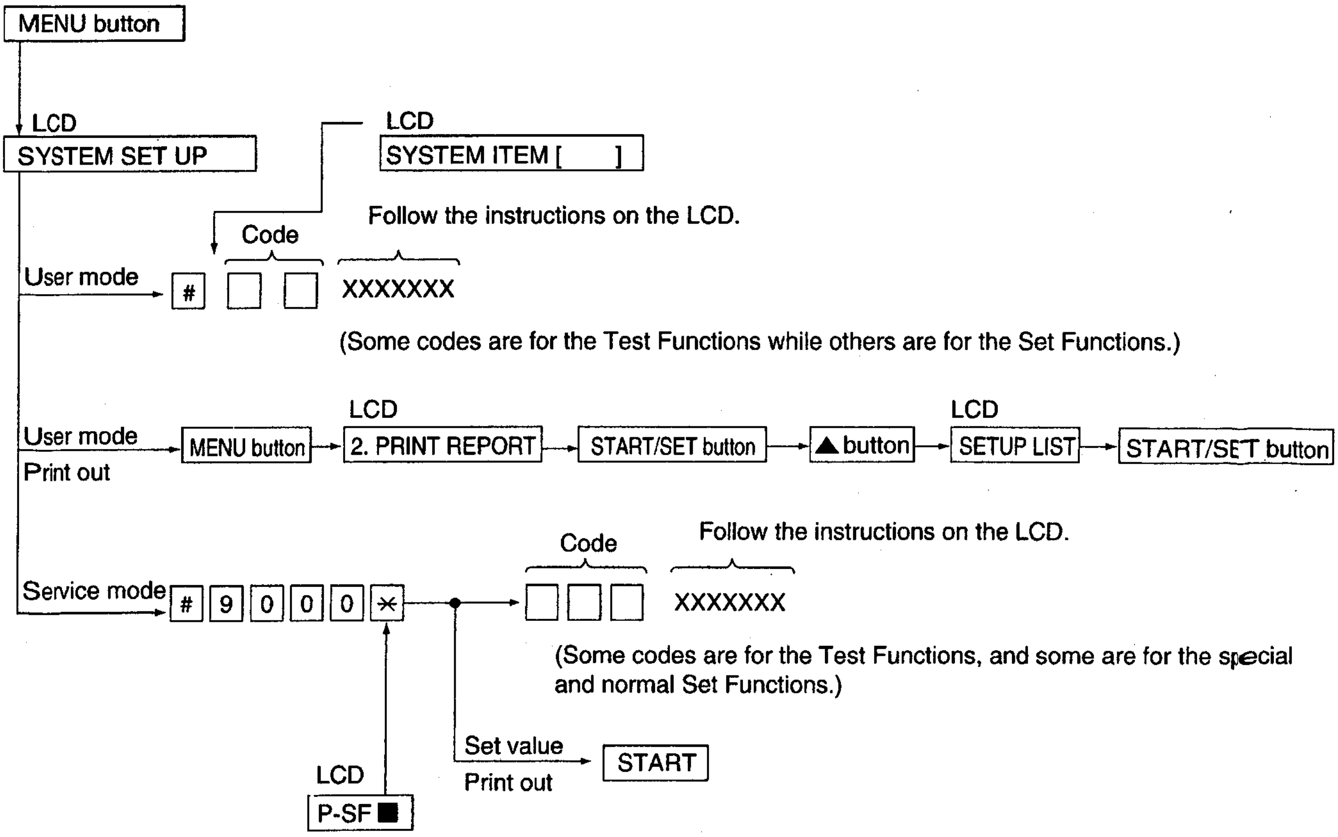
5.1 OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and available to the user. The special programs are those only listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test various functions . The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

5.2 OPERATION FLOW


Programming
User mode
(user programmable)
(1) Basic
(2) Advance
PRINT mode (Prints out a list to confirm the set values.)
Service mode
(non user programmable)
Normal
Special
(3) SET mode
(4) SET mode
(5) TEST mode
PRINT mode (Prints out a list to confirm the set values.)

Operating Procedure


MENU button
LCD
SYSTEM SET UP
LCD
SYSTEM ITEM [ ]
Follow the instructions on the LCD.
Code
User mode
#
XXXXXXX
(Some codes are for the Test Functions while others are for the Set Functions.)
LCD
LCD
User mode
Print out
MENU button
2. PRINT REPORT
START/SET button
▲ button
SETUP LIST
START/SET button
Code
Follow the instructions on the LCD.
Service mode
# 9 0 0 0 ✻
XXXXXXX
(Some codes are for the Test Functions, and some are for the special and normal Set Functions.)
Set value
Print out
START
LCD
P-SF ■

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	030	
502	Flash time set	X 10 msec	01~99	20	
511	Vox sense	1:High 2:Low	1, 2	1	
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See page 67.
521	International mode select	1:ON 2:OFF	1, 2	2	See page 67.
522	Auto standby select	1:ON 2:OFF	1, 2	1	The resolution reverts to the default when transmission is complete.
523	Receive equalizer select	1:0 km 2:1.8 km 3:3.6 km 4:7.2 km	1~4	1	When the telephone station is far from the unit or reception cannot be performed correctly, adjust.
524	Transmission equalizer select	1:0 km 2:1.8 km 3:3.6 km 4:7.2 km	1~4	1	
546	PBX flash time	X 10mm	01~99	08	
550	Memory clear: To reset the value to the default one, except the top margin (853) and left margin (854).				"START" input
551	ROM check				See page 130.
552	DTMF single tone test	1:ON 2:OFF	1, 2	2	See page 130.
553	Monitor on FAX communication select	1: OFF 2:PHASE B 3:ALL	1~3	1	
554	Modem test				See page 130.
557	LED test				See page 130.
558	LCD test				See page 130.
561	KEY test				See page 130.
563	CIS position adjustment value set	X 1 mm	1~7	4	
568	Time of detecting DC-Loop	X 1 mm	1~8	62	
571	ITS auto redial time set	X number of times	00~14	05	

Code	Function	Set Value	Effective Range	Default	Remarks
572	ITS auto redial line disconnection time set	X second	005~999	065	
573	Remote turn-on ring number set	X number of rings	01~99	10	
574	Dial Tone Detect	1:ON 2:OFF	1,2	2	
575	OFF-HOOK alarm option	1:ON 3:OFF	1,2	1	
576	DC-Loop Detect	1:ON 2:OFF	1,2	2	
590	FAX auto redial time set	X number of times	00~14	05	
591	FAX auto redial time disconnection time set	X second	005~999	065	
592	CNG transmit select	1: OFF 2:ALL 3:AUTO	1~3	2	
593	Time between CED and 300bps	1: 75 msec 2:500 msec 3:1 sec	1~3	1	See page 67.
594	Overseas DIS detection select	1:detects at the 1st time 2:detects at the 2st time	1, 2	1	See page 67.
595	Receive error limit value set	1: 5% 2:10% 3:15% 4:20%	10%	2	If the number of errors during transmission exceeds this value, the sending side terminates the call.
596	Transmit level set	X dBm	- 15~00	09	Values entered without a "minus sing" will be regarded as negative.
598	Receiving sensitivity	43= -43 dBm	20~48	41	See page 67.
599	ECM Memory size	1:256K byte 2:64K byte	1, 2	1	
*605	Recall mode	1:Flash 2:Earth Recall	1, 2	1	
624	AT ring tone out	1:3 sec 2:5 sec	1, 2	1	Sets the response time of the PC reciving.
630	Time of power save starting	X min	1~30	5	Sets the start time of the power save in the idle status.
700	Time of EXT.TAM OGM	X sec	01~180	16	
701	Silent Detect time	X 100msec		40	
717	Transmit speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Sets fall back speed in the transmitting mode.(See page 67.)

* 605: Used only when the option in use.

Code	Function	Set Value	Effective Range	Default	Remarks
718	Receive speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Sets fall back speed in the receiving mode.(See page 67.)
719	Ringer off in TEL/FAX mode	1:ON 2:OFF	1, 2	1	Selects whether the ring is on or off when the unit receives an incoming signal in the TEL/FAX mode when the ringer.
720	Tone Detect (After flashing)	1:ON 2:OFF	1, 2	2	Sets the tone detection mode after flashing
721	Pause tone detect	1:ON 2:OFF	1, 2	2	Sets the tone detection mode in pause.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Sets the tone detection mode after redialing.
724	Busy tone detection for PC fax transmission	1:ON 2:OFF	1, 2	1	
732	Auto disconnect	1:350ms 2:1800mc 3:OFF	1~3	1	
763	CNG detect time for friendly reception	1:10 sec 2:20 sec 3:30 sec	1~3	3	The period during which CNG is deteced during friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets the time out.
788	Shading and detecting white peak level				See page 137.
815	Sensor & Vox check				See page 131.
852	Print test pattern				See page 130.
853	Top margin		1~9	--------	
854	Left margin		1~8	--------	
861	A4 size set	1:Letter 2:A4 3:Leagal	1, 2, 3	2	
878	Auto Prepause time	x msec	00~99	30	
880	History list				See page 123.
881	Journal 2 list				See page 128.
882	Journal 3 list				See page 129.
890	TEL/FAX 1st ring back tone	1:ON 2:OFF	1, 2	1	Selects whether the TEL/FAX 1st ring back tone is ON or OFF in the TEL/FAX mode.

5.3 USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

```
Einstellungen

[ Grundeinstellungsliste ]
  <- Code
Nr.   Leistungsmerkmal                    Gegenwärtige Einstellung
#01   Datum & Uhrzeit                     01 Jan. 1999 00:00
#02   Ihr Logo
#03   Teilnehmerkennung
#04   Ausdruck Übertragungsbericht        Fehler     [Fehler,Ein]
#06   Rufzähler FAX                       2          [1...9]
#12   Fernabfragecode                     Aus        [Ein,Aus]
                                 Code  =  11
#13   Wahlverfahren                       MFV        [MFV,IWV]
#14   PC Verbindung                       Ein        [Ein,Aus]
                                            ^ Set Value

[ Erweiterte Einstellunsliste ]

Nr.   Leistungsmerkmal                    Gegenwärtige Einstellung
#22   Automatischer Journalausdruck       Ein        [Ein,Aus]
#23   Übersee-Modus                       Aus        [Ein,Aus]
#25   Zeitversetzte Übertragung           Aus        [Ein,Aus]
 ^                               Ziel  =
  Code                     Start-Zeit  =  00:00
#30   Rufzähler Faxweiche                 3          [3...6]
#37   Automatischer Verkleinerung         Ein        [Ein,Aus]
#38   Halbton-Modus                       Autom.     [Foto,Automatisch]
#39   LCD-Kontrast                        Normal     [Normal,Dunkel]
#40   Stilleerkennung                     Aus        [Ein,Aus]
#41   Fax Ferneinschaltung                Ein        [Ein,Aus]
                          Einschaltcode  =  *9
#44   Empfangs-Signalisierung             Ein        [Ein,Aus]
#46   Erweiterter Empfang                 Ein        [Ein,Aus]
#48   Sprache                             Deutsch    [Deutsch,English]
#60   Express-Modus                       Aus        [Ein,Aus]
#62   TelefonanschluB                     AMT        [AMT,NBST]
#63   AKZ 1                            =
#64   AKZ 2                            =
#65   AKZ 3                            =
#66   AKZ 4                            =
#68   ECM-Übertragung                     Ein        [Ein,Aus]
#71   Rufmelodie                          A          [A,B,C]
                                          ^ Set Value
```

Note:

1. The above values are the default values.
2. For #06 the display will be different depending on the receive mode.
   The example above is the TAD/FAX mode.
   For the fax only mode, " `#06 Fax ring count    2      [1...4]` " will be displayed.

5.4 SERVICE MODE SETTINGS (Example of a printed out list)

```
[ Service Daten Liste ]
   Code                                 Set Value
501 Pausenzeit               =  030*100ms         [001...600]*100ms
502 Flashdauer               =  20*10ms           [01...99]*10ms
520 CED Frequenz             =  2100Hz            [1=2100   2=1100]Hz
521 Intl. Modus              =  Aus               [1=Ein    2=Aus]
522 Bereitschaftsmodus       =  Ein               [1=Ein    2=Aus]
523 Empfangsentzerrung       =  0.0Km             [1=0.0    2=1.8    3=3.6    4=7.2
524 Sendeentzerrung          =  0.0Km             [1=0.0    2=1.8    3=3.6    4=7.2
605 Signal-Taste[●]          =  FLASH             [1=FLASH   2=ERDE]
630 Sparmodus                =  05min             [01...30]min
700 Ansagezeit/TAM           =  16sek.            [01...180]sek.
701 Stilleerkennungzeit      =  40*100ms          [01...99]*100ms
853 Oberer Druckrand         =  3                 [1...5]
854 Linker Druckrand         =  2                 [1...3]

[ Spezielle Service Einstellungen ]

  511  546  552  553  563  568  571  572  573  575  576  590  591
    1   08    2    1   04   62   05  065   10    1    2   05  065
Code
  592  593  594  595  596  598  599  624  717  718  719  720  721
    2    1    1    2   09   41    1    1    1    1    1    2    2

  722  724  732  763  771  861  890
    1    1    1    3    1    2    1
                                       Set Value
Betriebsstunden = 00000 Stunden


FCU    Version = E421GA  C2DC
ICU    Version = 38
ENGINE Version = 41
```

【 HISTORY 】

```
      E 4 2 1 G A ─(1)          C 2 D C    3 8 ─(49)   4 1 ─(50)
      N O N E ─(3)
      N O N E ─(4)
      N O N E ─(5)
(6)─  0 0 0 0 0   J a n ─(7)   0 1 ─(8)    2 0 0 0 ─(9)          1 2 0 0 A M ─(10)
(11)─ 0 0 0 0 0   0 0 0 0 0 ─(12)
                      (14)          (15)
(13)─ 0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   N O N E     ─(16)     T E L ─(17)
      0 0 0 0 0   0 0 0 0 0   T O N E     L E G A L   ─(19)     0 0 0 0 2 ─(20)
                      (22)          23)
(21)─ 0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   N O N E     ─(24)     N O N E ─(25) 0 0 0 0 0
                      (27)          28
(26)─ 0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   ─(29)
                                                                      (34)
(30)─ 0 0 1       0 0 0  (32)─ 0 0 0 0 0  C O M P L E T E ─(33)  0 0 0 0 0   0 0 0 0 0 ─(35)
                      (31)          38
(36)─ 0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   ─(39) (40)─ 0 0 0 0 0   0 0 0 0 0 ─(41)
                      (43)          44
(42)─ 0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   0 0 0 0 0   ─(45)       0 0 0 0 0 ─(46)

      2 0   2 0   2 0   2 0   3 C   3 A   3 1   0 4   3 A   3 1   3 A   3 1   3 A
      3 A   0 4   3 1   3 2   3 A   3 A   0 4   2 0   2 0   2 0   0 4   2 5   2 5
      2 6   0 4   2 0   2 0   3 C   3 9   3 A   3 A   3 A   3 B   3 8   3 9   3 A   ─(47)
      0 4   3 9   3 9   3 A   3 8   3 8   3 A   0 4   0 0   0 0   0 0

      0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0
      0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0
      0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   ─(48)
      0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0   0 0
```

Descriptions of individual items on the previous page.

(1) **ROM VERSION (FCU)**
EPROM version

(2) **SUM**
EPROM internal data calculation.

(3) **YOUR LOGO**
The recorded LOGO in the unit. If it is not recorded, NONE will be displayed.

(4) **YOUR TELEPHONE NUMBER**
The recorded user telephone number in the unit. If it is not recorded, NONE will be displayed.

(5) **FAX PAGER NUMBER**
If you program a pager number into the unit, the pager number will be displayed here.

(6) **FACTORY - CUSTOMER**
This shows how many days from factory production until the user turns ON the unit.

(7) **MONTH**
(8) **DAY**
(9) **YEAR**
(10) **TIME**

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) **USAGE TIME**
The amount of time the unit has been powered ON.

(12) **FACTORY - NOW**
This shows how many days from factory production until the user prints out this history list.

(13) **TEL MODE**
The amount of time the TEL mode setting was used.

(14) **FAX MODE**
The amount of time the FAX mode setting was used.

(15) **TEL/FAX MODE**
The amount of time the TEL/FAX mode setting was used.

(16) **ANS/FAX MODE**
The amount of time the ANS/FAX mode setting was used.

(17) **FINAL RECEIVE MODE**
The last set receiving mode by the user.

(18) **TONE/PULSE SELECTION**
The most recently used setting used, either TONE or PULSE.

(19) **AUTO REDUCTION**
The compression length when receiving.

(20) **SETTING NO. OF DIRECTORY**
The recorded directory stations (one touch and JOG DIAL).

(21) **NUMBER OF COPY**
The number of pages copied.

(22) **NUMBER OF RECEIVE**
The number of pages received.

(23) **NUMBER OF SENDING**
The number of pages sent.

(24) **NUMBER OF CALLER ID**
The number of times Caller ID was received.

(25) **NUMBER OF RECORDING MESSAGE**
The number of messages recorded in TAM.

(26) **NUMBER OF PC SCAN**
The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)

(27) **NUMBER OF PC-PRINT**
The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) **NUMBER OF RECEIVING TO PC**
The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)

(29) **NUMBER OF SENDING FROM PC**
The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(30) **NUMBER OF PRINTING WARNING LIST**
The number of warning lists printed until now.

(31) **NUMBER OF PRINTING HELP**
The number of help lists printed until now.

(32) **NUMBER OF DIVIDED PRINTING IN FAX RECEPTION**
The number of faxes received that were divided into more than one sheet since the unit was purchased.

(33) **DETECTION OF RS232C**
When the fax and PC serial interface (RS232C) are connected and the signal is received correctly, COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed.
(The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(34) NO. OF IQ FAX LOADING -OK
(35) NO. OF IQ FAX LOADING -NG
You may not be able to use IQ-FAX if the special subscriber information is not loaded from the IQ-FAX center before use. Depending on the conditions of the communication line, it may not be completed in one time, so retried will be performed. The number of times there was an OK and NG are printed.

(36) FAX MODE
Means the unit received a fax message in the FAX mode.

(37) MAN RCV
Means the unit received a fax message by manual operation.

(38) FRN RCV
Means the unit received a fax message by friendly signal detection.

(39) VOX
Means the unit detected silence or no voice.

(40) RMT DTMF
Means the unit detected DTMF (Remote Fax activation code) entered remotely.

(41) PAL DTMF
Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.

(42) TURN-ON
Means the unit started to receive after 15 rings.
(Remote Turn On: Service Code #573)

(43) TIME OUT
Means the unit started to receive after Ring Time Out in the TEL/FAX mode.

(44) IDENT
Means the unit detected Ring Detection.

(45) CNG OGM
Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode.
OR
Means the unit detected the CNG while it was sending the OGM in the TAD/FAX mode.

(46) CNG ICM
Means the unit detected the CNG while it was recording the ICM in the TAD/FAX mode.

(47) KEY OPERATION -1st 50
(48) KEY OPERATION -Last 50
Indicates 2-digit codes. Refer to "5.2 BUTTON CODE
TABLE" on page 116.
- 1st 50: History of the first 50 key operations after purchase.
- (Ex.) If 20, 3C and 39 are printed, then the MENU, # and 9 buttons were pressed.

Last 50:History of the last 50 key operations.

(49) ICU VERSION
Image Control Software Version.

(50) ENGINE VERSION
lEngine Control CPU Version.

5.5 SPECIAL SERVICE JOURNAL REPORTS

Journal 2 or Journal 3 shown below, which are special journals giving additional detailed information about the latest 35 communications, can be printed using service code 881 or 882. They can also be printed out remotely (with the existing journal). [Refer to page 81.] Journal 2 and Journal 3's data are related.

```
JOURNAL
                                                                 Mar. 23 1998 09:51PM

NO. OTHER FACSIMILE  START TIME         USAGE TIME  MODE    PAGES  RESULT                  *CODE
01  3332222          Jan. 21 02:14PM    00'45       SND     01     OK
02  9998765          Jan. 21 03:17PM    00'58       IQ-FAX  02     OK
03  John             Jan. 21 05:18PM    00'48       RCV     01     OK
04  555556677        Jan. 22 10:35AM    02'45       SND     03     COMMUNICATION ERROR  (43)
```

```
JOURNAL 2
                                                                   Mar. 23 1998 09:51AM
          ①               ②                 ③                    ④                 ⑤
NO.    RCV. MODE      SPEED (CNT.)     RESOLUTION          RCV-TRIG.(CNT.)     ERROR->MEMORY
01     TEL            9600BPS          STD.
02     TEL            9600BPS          FINE
03     FAX ONLY       7200BPS          STD.                FAX MOD
04     FAX ONLY       9600BPS          STD.                CNG (0003)

NO RESPONSE DISAPPEARED ON JOURNAL

                          ①                 ④
NO.    START TIME     RCV MODE         RCV-TRIG (CNT.)

       YOUR LOGO
       YOUR FAX NUMBER
```

```
JOURNAL 3
                                                                   Mar. 23 1998 09:51AM
          ⑥               ⑦                 ⑧                    ⑨                 ⑩
NO.    ENCODE         MSLT             EQM(RX)             ERROR LINE(RX)      MAKER CODE
01     MH             20msec           0000                00000               79
02     MH             20msec           0000                00000               00
03     MR             20msec           1200                00013               00
04     MR             20msec           0000                00000               00
```

For example, the 1st communication in the Journal above is a Fax transmission in the Tel mode, at 9.6 kbps TX speed, the resolution is standard, a MH code is used, and the Maker code is 79.
The 2nd one is IQĐFax in Tel mode, and the resolution is fine etc.

CNG (0003) means the 3rd time a CNG signal was received for Fax Rx from purchasing the unit until now.
Jouranl 2 and Journal 3 are explained on the next page.

5.5.1 JOURNAL 2

Journal 2 displays the additional detailed information about the last 35 communications.

Description of individual items from the previous page.

① **RCV. MODE**
Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.

② **SPEED**
Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.

③ **RESOLUTION**
Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.

④ **RX-TRIG. (CNT.)**
Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in the below [Refer to (36)~(41) on page 125.] The values in parentheses indicate how many times the trigger has been used. (For example, "00003" means three times.)

⑤ **ERROR→MEMORY**
Indicates the reason why the unit received a fax message in memory.
In the printing example on the next page, a "paper out" error occurred and direct reception to fax memory took place.

NO RESPONSE DISAPPEARED ON JOURNAL

The NO RESPONSE DISAPPEARED ON JOURNAL displays the information about the last 10 communications terminated with No Response. (Some of the communications terminated by No Response were not displayed in the JOURNAL.)
When fax transmission cannot be performed because the other party's unit is set to the TEL mode, " No response" will be printed.

5.5.2 JOURNAL 3

Description of individual items.

⑥ **ENCODE**
Compression Code : MH/MR

⑦ **MSLT**
MSLT means Minimum Scan Line Time.
Use only at the factory.

⑧ **EQM**
EQM means Eye Quality Monitor.
Use only at the factory.

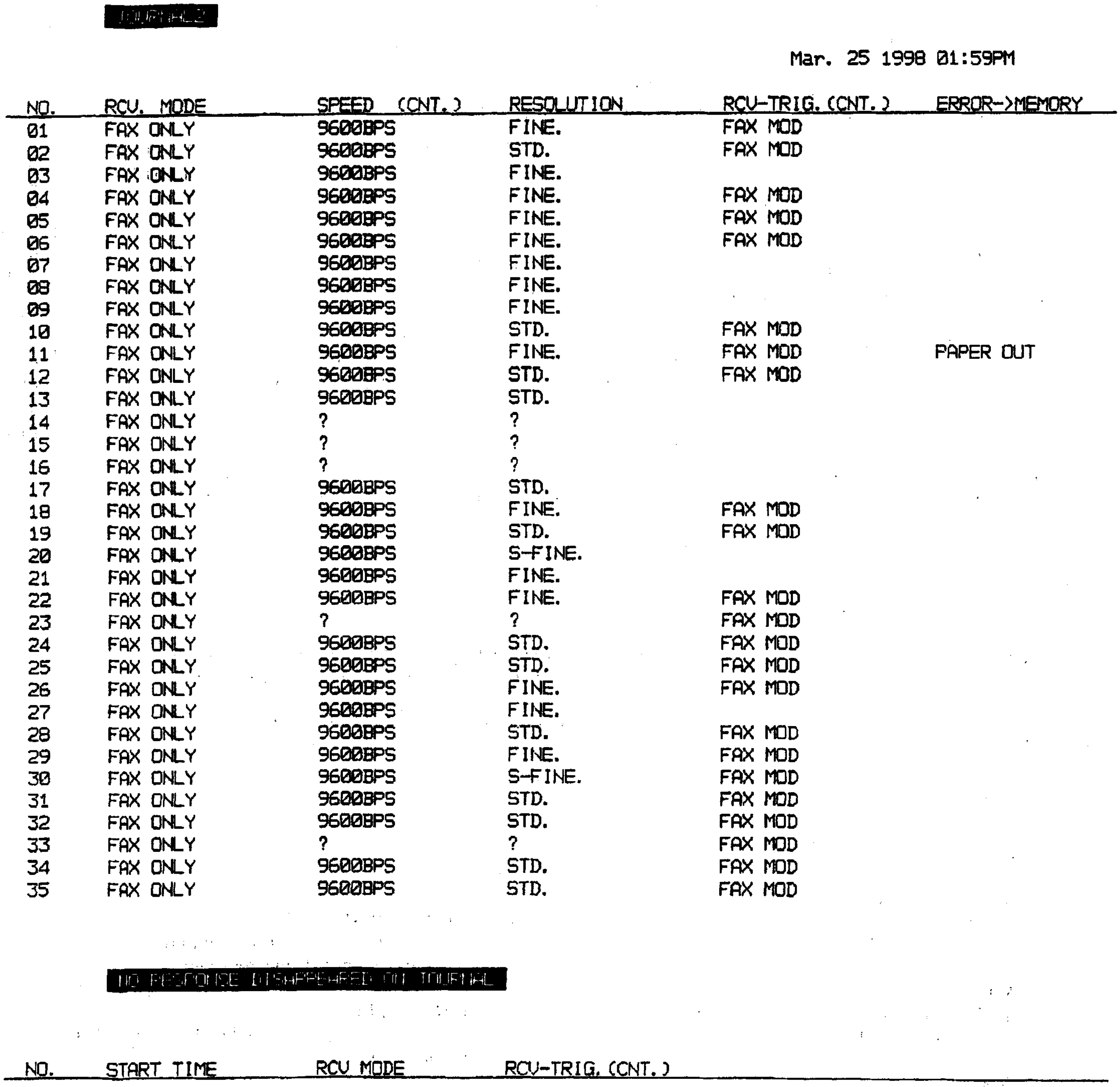
⑨ **ERROR LINE(RX)**
When an error occurs while receiving a fax, this shows the number of lines received.

⑩ **MAKER CODE**
This shows a 2 digit code of the other party's fax machine brand.

0E: "KX" model
00: Unknown
79: "UF" model
19: "Zerox" model

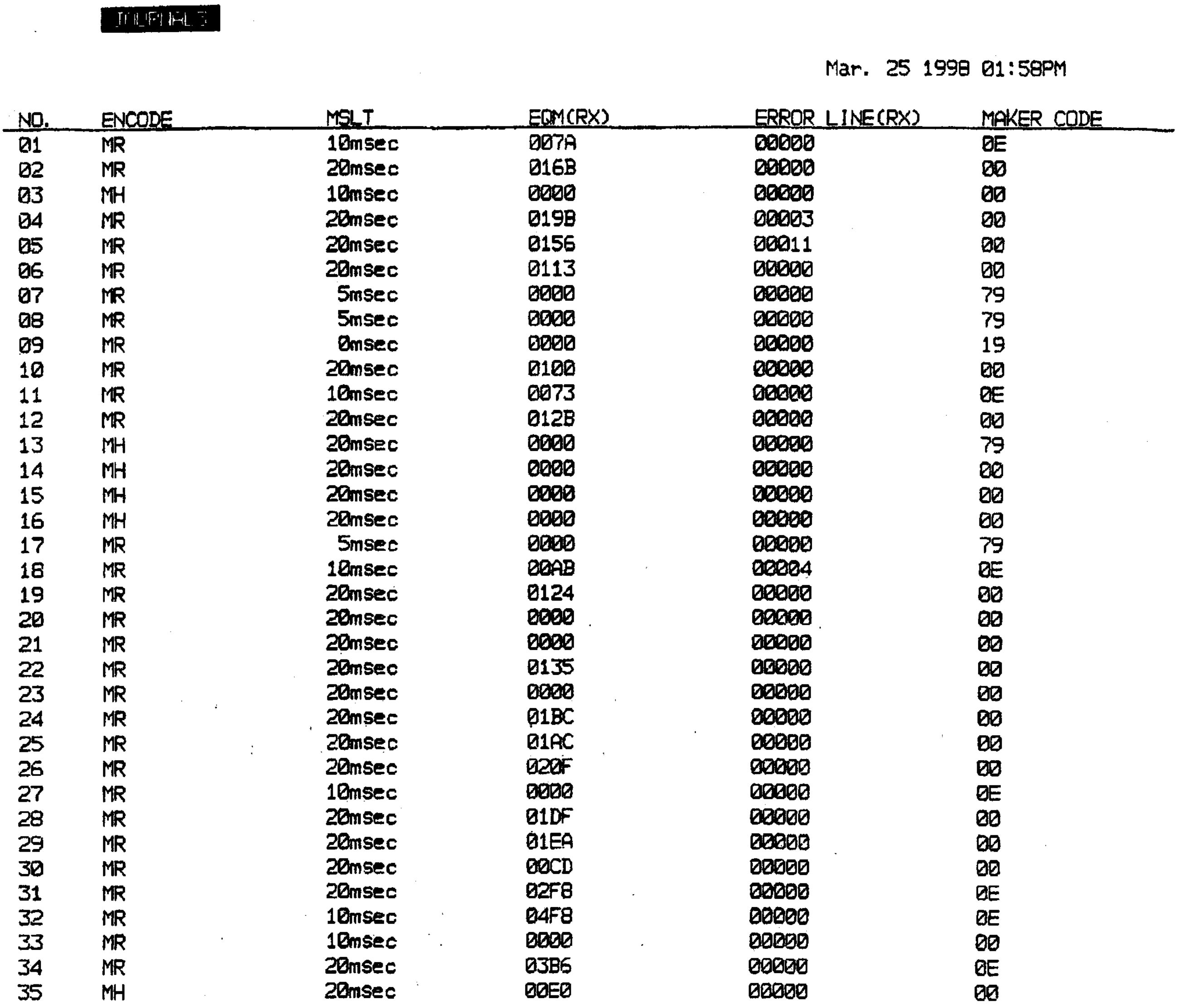
5.5.3 PRINTOUT EXAMPLE

JOURNAL 2



```
            JOURNAL 2

                                                                     Mar. 25 1998 01:59PM

NO.    RCV. MODE          SPEED  (CNT.)    RESOLUTION          RCV-TRIG.(CNT.)   ERROR->MEMORY
01     FAX ONLY           9600BPS          FINE.               FAX MOD
02     FAX ONLY           9600BPS          STD.                FAX MOD
03     FAX ONLY           9600BPS          FINE.
04     FAX ONLY           9600BPS          FINE.               FAX MOD
05     FAX ONLY           9600BPS          FINE.               FAX MOD
06     FAX ONLY           9600BPS          FINE.               FAX MOD
07     FAX ONLY           9600BPS          FINE.
08     FAX ONLY           9600BPS          FINE.
09     FAX ONLY           9600BPS          FINE.
10     FAX ONLY           9600BPS          STD.                FAX MOD
11     FAX ONLY           9600BPS          FINE.               FAX MOD           PAPER OUT
12     FAX ONLY           9600BPS          STD.                FAX MOD
13     FAX ONLY           9600BPS          STD.
14     FAX ONLY           ?                ?
15     FAX ONLY           ?                ?
16     FAX ONLY           ?                ?
17     FAX ONLY           9600BPS          STD.
18     FAX ONLY           9600BPS          FINE.               FAX MOD
19     FAX ONLY           9600BPS          STD.                FAX MOD
20     FAX ONLY           9600BPS          S-FINE.
21     FAX ONLY           9600BPS          FINE.
22     FAX ONLY           9600BPS          FINE.               FAX MOD
23     FAX ONLY           ?                ?                   FAX MOD
24     FAX ONLY           9600BPS          STD.                FAX MOD
25     FAX ONLY           9600BPS          STD.                FAX MOD
26     FAX ONLY           9600BPS          FINE.               FAX MOD
27     FAX ONLY           9600BPS          FINE.
28     FAX ONLY           9600BPS          STD.                FAX MOD
29     FAX ONLY           9600BPS          FINE.               FAX MOD
30     FAX ONLY           9600BPS          S-FINE.             FAX MOD
31     FAX ONLY           9600BPS          STD.                FAX MOD
32     FAX ONLY           9600BPS          STD.                FAX MOD
33     FAX ONLY           ?                ?                   FAX MOD
34     FAX ONLY           9600BPS          STD.                FAX MOD
35     FAX ONLY           9600BPS          STD.                FAX MOD


            NO RESPONSE DISAPPEARED ON JOURNAL


NO.    START TIME         RCV MODE         RCV-TRIG.(CNT.)
```

JOURNAL 3



JOURNAL 3

Mar. 25 1998 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

6. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are receivedfrom customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test mode	Type of Mode	Code □□□ Operation after code input	Function
MODEM TEST	Service Mode	5 5 4	First, go OFF-HOOK with the handset to enter this Test Mode. Each time you press the start key, each of the signals will be heard in the following order from the handset. 1) OFF → 2) 14400bps → 3) 12000bps → 4) 9600bps (V17) → 5) 7200bps (V17) → 6) 9600bps → 7) 7200bps → 8) 4800bps → 9) 2400bps → 10) 300bps →11) 2100Hz →12) 1100Hz
		START	
ROM CHECK	Service Mode	5 5 1	
		START	Indicates the version and check sum of the ROM on the digital board.
		START	Indicates the version and check sum of the ROM on the enginel board.
		START	Indicates the version and check sum of the ROM on the printing contoller board.
LCD CHECK	Service Mode	5 5 8	Checks the LCD indication. Illuminates all the dots to check if they are normal.
		START	
DTMF SINGLE TEST	Service Mode	5 5 2	Outputs DTMF as single tones. Used to check the frequencies of the individual DTMF tones. Refer to "6.1 DTMF Single Tone Transmit Selection" on page 131.
		1..On 2..Off	
LED TEST	Service Mode	5 5 7	All LEDs above the operation panel board flash on and off, or are illuminated.
		START	
KEY CHECK	Service Mode	5 6 1	Checks the button operation. Indicates the button code on the LCD while the button is pressed. Refer to "6.2 Button Code Table" on page 131.
		START {any key}	
FACTORY SET	Service Mode	5 5 0	Clears the memory where the user can store data.
		START	
PRINT TEST PATTERN	Service Mode	8 5 2	Prints out the test pattern. Used mainly at the factory to test the print quality. You can select 1~4. (See pages 132~134.)
		START	

Test mode	Type of Mode	● Code ☐☐☐ ● Operation after code input.	Function
SENSOR CHECK & VOX CHECK	Service Mode	8 1 5 START	After entering this mode, by operating the sensor levers, etc, using your hands, each sensor and SW display above the LCD will go ON/OFF. Also, when copying a document, the related sensor will turn ON/OFF. (D, S, P, R)
		LCD display DSCOMP*REDGT52V	For each sensor's operation, refer to page 229.
		D: Document S: Scaner read Pos. O: Operation panel cover C: Printer Cover M: Manual tray P: Paper exist R: Pick up paper *: none D: Drum exist G: Developer exist T: Toner exist 5: 5 V release 2: 2 4 V release V: Vox exist	When a document is inserted. When a document is inserted. When Operation panel is open When Top Cover is open When recording paper is set. When recording paper is set. When recording paper exist. When a drum is existing. When a developer is existing. When a toner is existing. When the voltage of 5 V is not supplied to LSU. When the voltage of 24 V is not supplied to HVPS. When VOX exist.

Note: The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

6.1 DTMF SIGNAL TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	Key	Low Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) Low (Hz)	1209	1336	1477
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	*	"0"	"#"

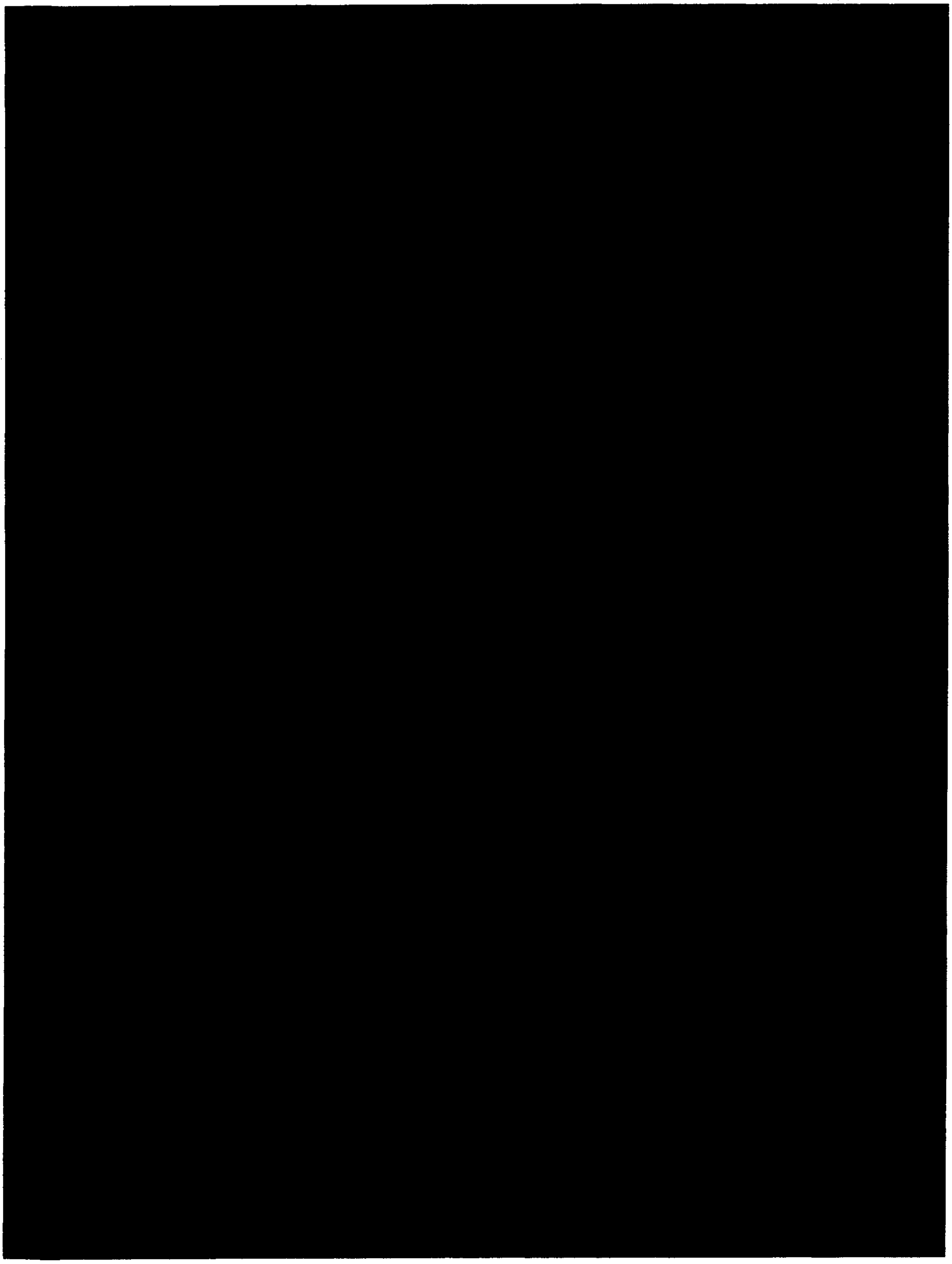
Note: After performing this check, do not forget to turn the setting off.
Otherwise, dialing using DTMF will not be possible.

6.2 BUTTON CODE TABLE

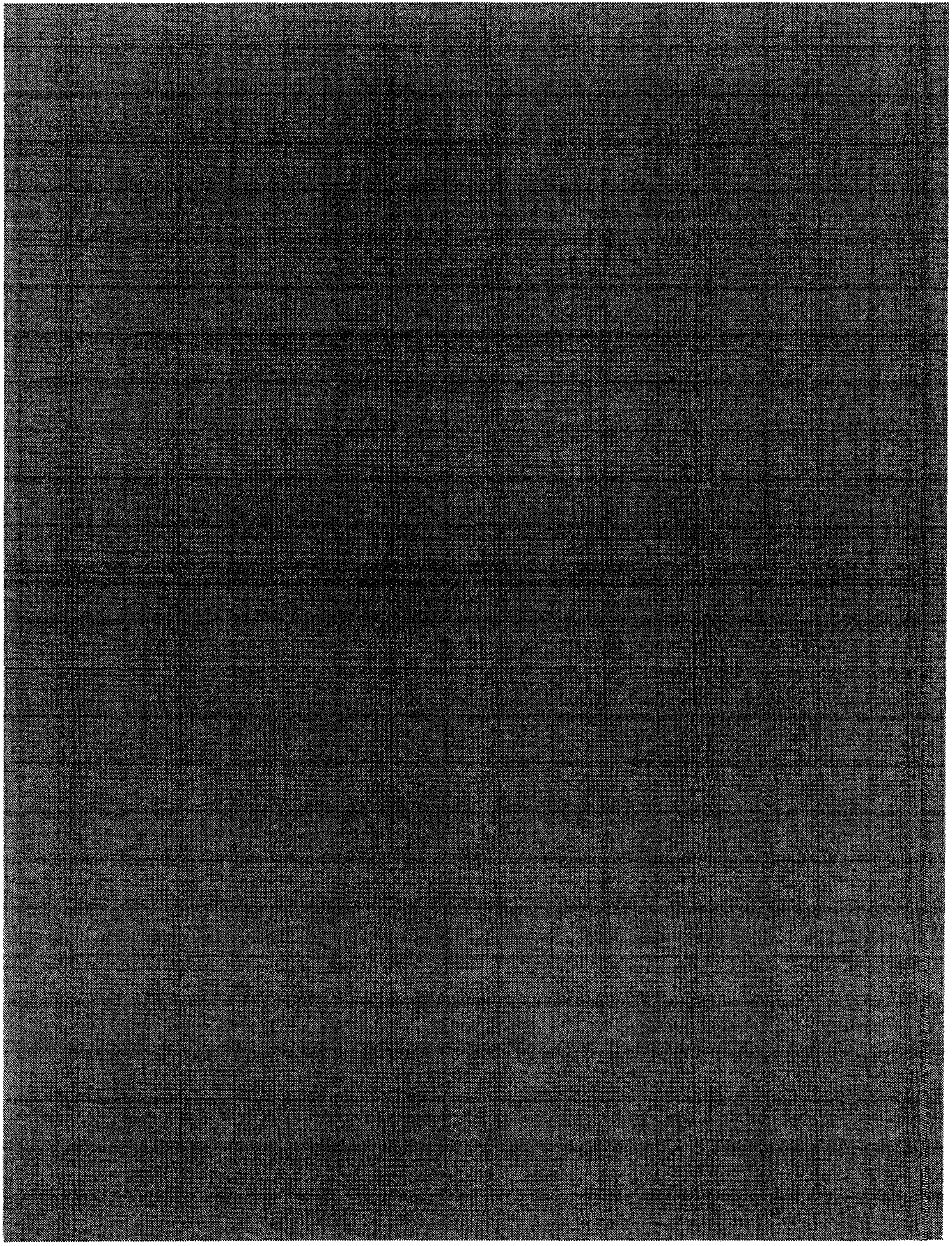
Code	Button Name	Code	Button Name	Code	Button Name
1E	JOG (RIGHT)	25	▲ LAUTSTÄRKE	3C	#
1F	JOG (LEFT)	26	▼ LAUTSTÄRKE	3D	◐●
00	NO INPUT	31	1	3E	●
01	⊠	32	2	48	NAME/TEL NO.
02	AUFLÖSUNG	33	3	64	STATION 1
04	STAKT / ⇥ / KOPIE	34	4	65	STATION 2
05	UNTEN	35	5	66	STATION 3
08	MONITOR	36	6	67	STATION 4
0A	HÖRER STOMM	37	7	68	STATION 5
0C	ABWESEND	38	8	69	STATION 6
20	MENÜ	39	9	6A	STATION 7
22	HILFE	3A	0	6B	STATION 8
24	TELEFONBUCH	3B	*	6C	STATION 9
				6D	STATION 10
				6E	STATION 11

6.3 PRINT TEST PATTERN

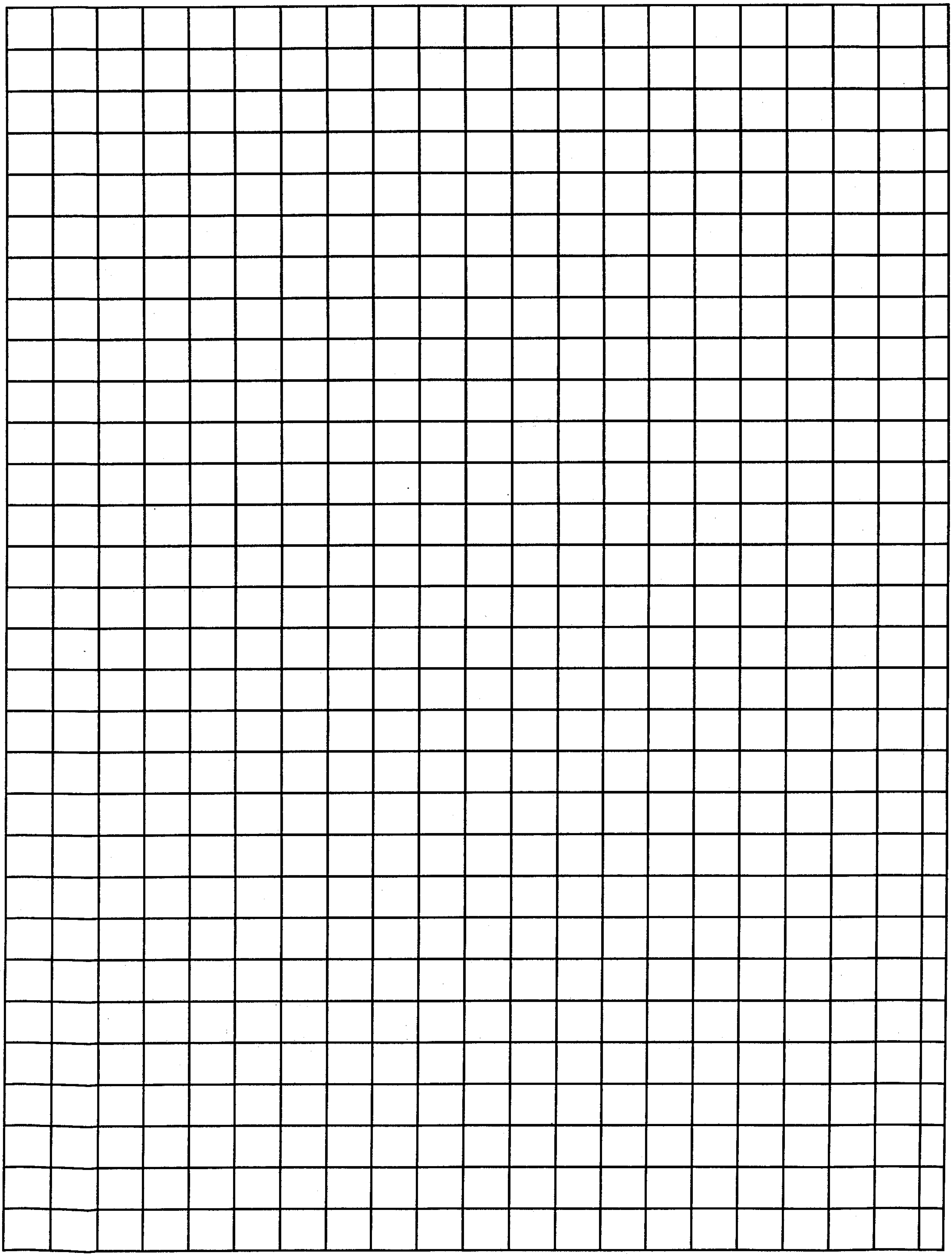
(Reference pattern)



(Reference pattern)



(Reference pattern)



MEMO

ADJUSTMENT

1. Shading .... 137~142
2. High Voltage Value Check. 143, 144

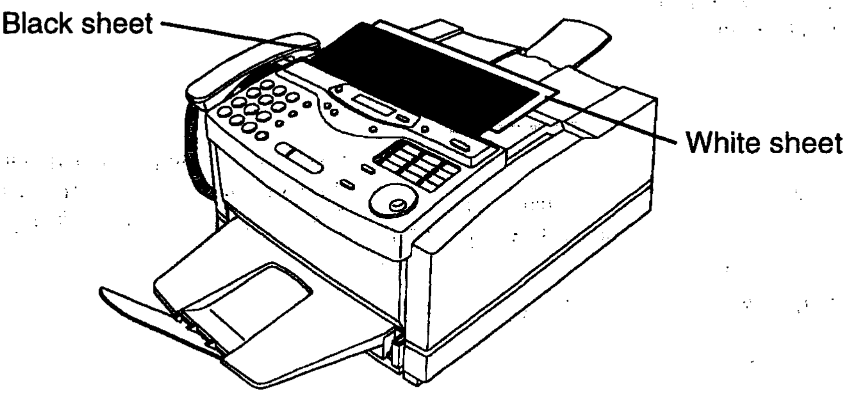
1. SHADING

In the case as shown below, you should save the shading data.

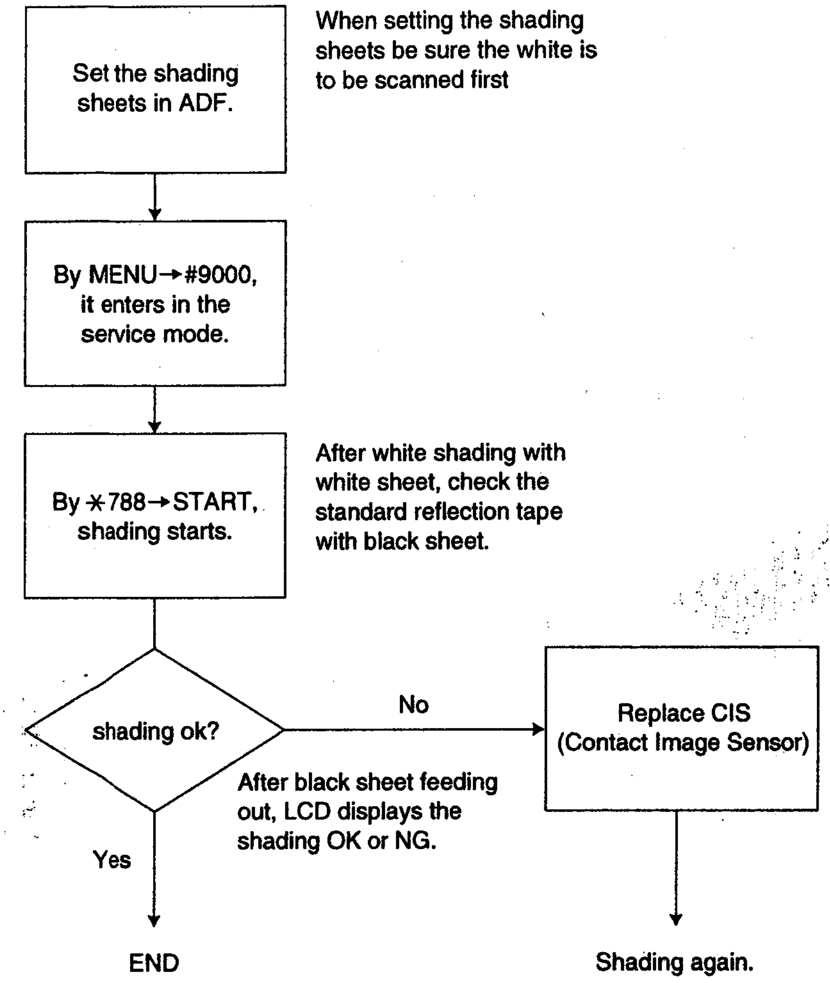
- You replace the printer contral board.
- You replace the CIS unit.

How to save the shading data

At first, you cut the shading sheets included in Service Manual.(page 139,141)
There are 2 sheets, white and black.
Insert these sheets in ADF. In this time, you must set the white sheet is under the black sheet.
Then, you enter the service mode 788, start shading.



After the end of shading, If the LCD displayed "SHADING NG", Check the white tape position that is stuck the end of CIS.
If the tape is inside, replace the tape to outside.


Set the shading sheets in ADF.
By MENU→#9000, it enters in the service mode.
By ✳788→START, shading starts.
shading ok?
No
Yes
Replace CIS (Contact Image Sensor)
END
Shading again.

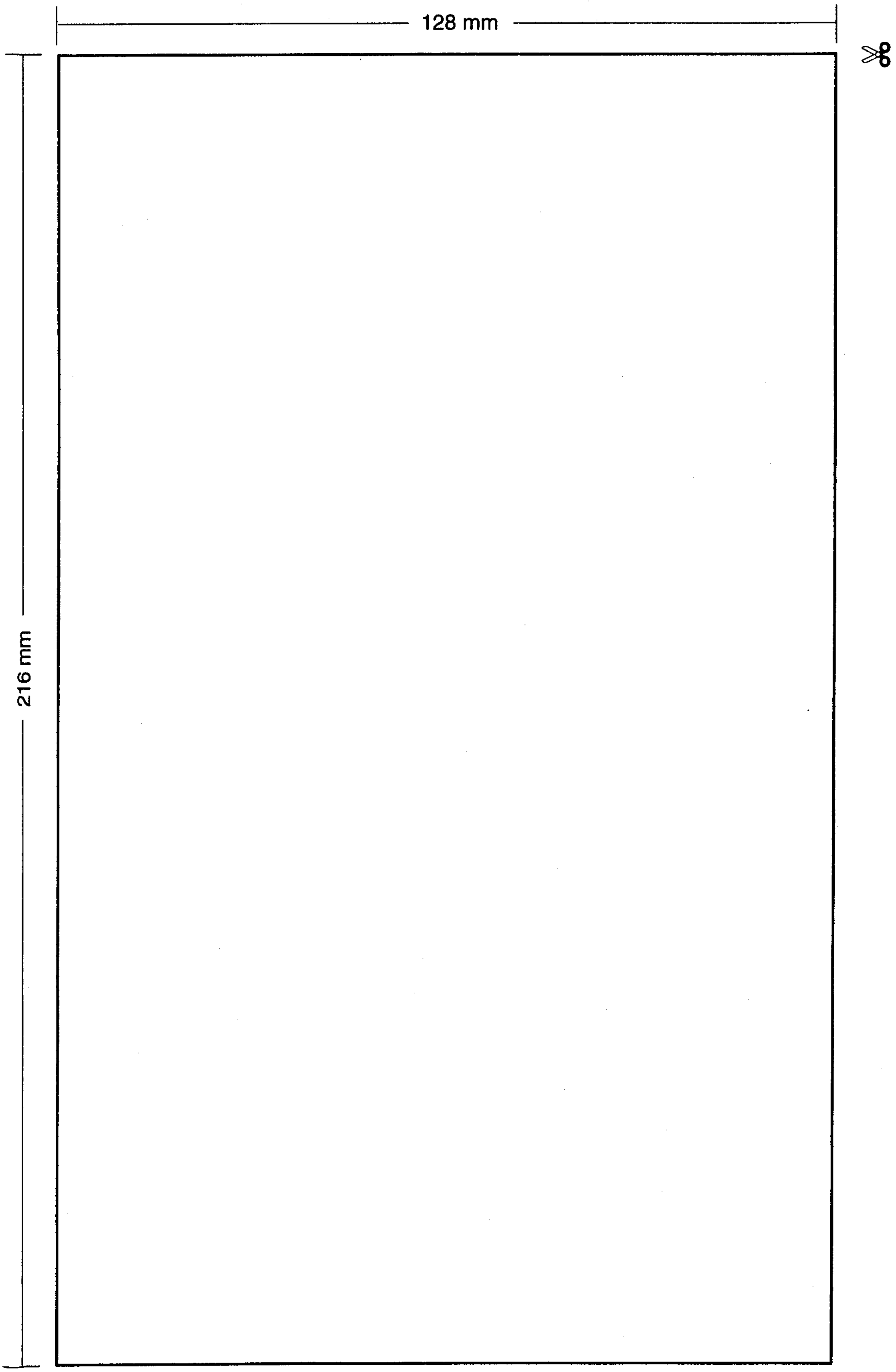
When setting the shading sheets be sure the white is to be scanned first

After white shading with white sheet, check the standard reflection tape with black sheet.

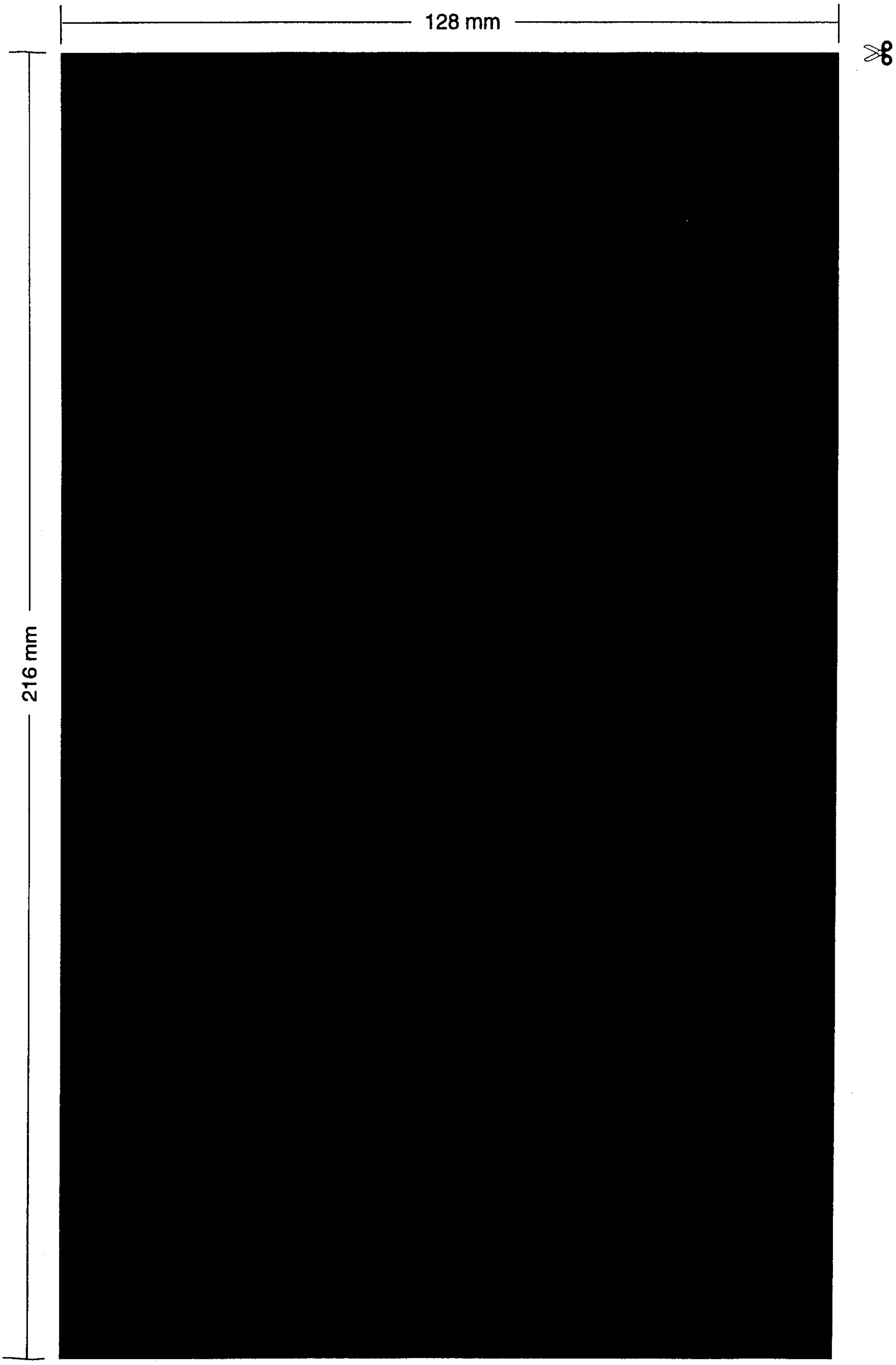
After black sheet feeding out, LCD displays the shading OK or NG.

Note: When improper setting of the shading sheet causes feeding failure, "NG" may appear on the display.

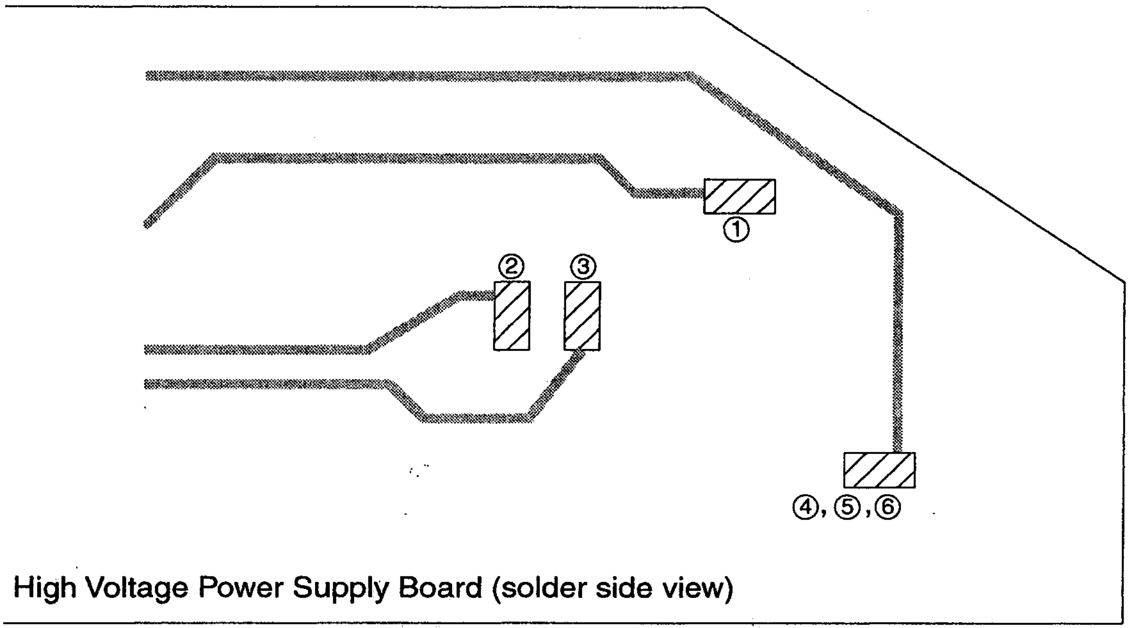
Shading Sheet (1)


128 mm
216 mm

Shading Sheet (2)


128 mm
216 mm

2. High Voltage Value Check Point



High Voltage Power Supply Board (solder side view)

No.	BIAS Name	VALUE	Check Timing
①	PR(Charging)	-1180V	Demo Print : After the MOTOR start to rotate.
②	CH(Supply)	-600V	Demo Print : After the MOTOR start to rotate.
③	DE(Developing)	-350V	Demo Print : After the MOTOR start to rotate.
④	RTR(Cleaning)	-870V	Demo Print : After the recording paper is started to feed.
⑤	TR(Transfer)	+600 ~ +2.3kV *	Demo Print : After the recording paper is started to eject.
⑥	TR(Transfer)	+11μA	Manual Feed Print : After the recording paper is started to eject.

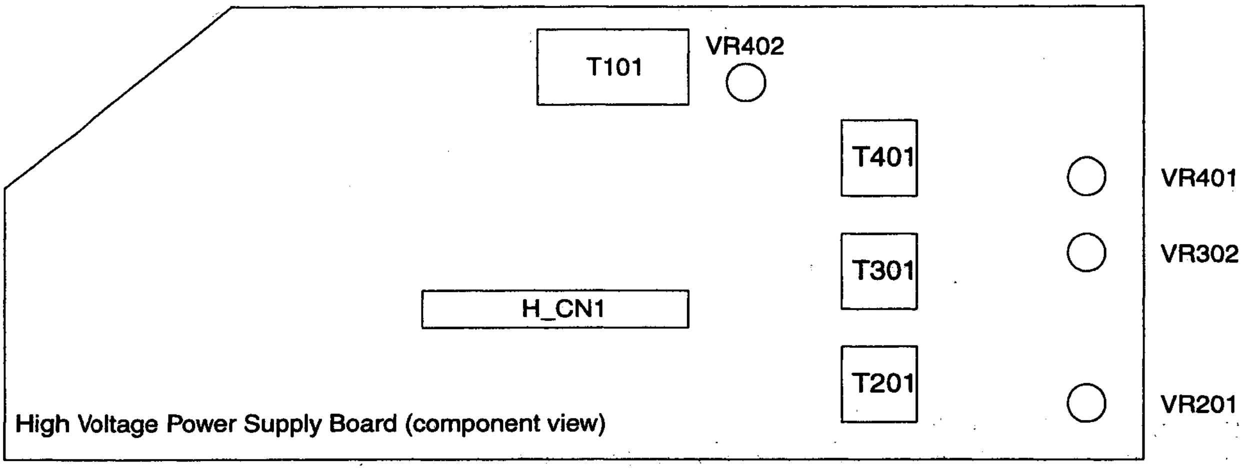
* This voltage changes according to paper kind.

Measuring Instruments
① ~ ⑤ : High Voltage Probe
⑥ :Multimeter(μA range)

*NOTE: Insert the multimeter between J5,J6 on HVPS board and TRANSFER terminal.

How to adjust the high voltage value

When you replace any parts, you should check the high voltage value.
If that value isn't correct, adjust it by using the volume registor.
Refer to the following chart.


T101
VR402
T401
VR401
T301
VR302
H_CN1
T201
VR201
High Voltage Power Supply Board (component view)

BIAS	DEFAULT VALUE	ADJUSTMENT POINT
PR	-1200V±5%	VR201
CH	-600V±5%	VR302
DE	-350V±5%	VR302
RTR	-850V±5%	VR401
TR	11µA±5%	VR402

DISASSEMBLY INSTRUCTIONS

1. How to remove the Paper Cassette,the Printer Controller board,
the Digital Board and the Analog Board 146
2. How to remove the Drum Unit and Toner Cartridge 147
3. How to remove the Main Case 148
4. How to remove the LSU Unit 149
5. How to remove the Operation Panel Block/ Sub Frame Block 149
6. How to remove the Power Supply Unit 150
7. How to remove the Motor Block 151
8. How to remove the High Voltage Power Supply Board 152
9. How to remove the Pick up Ass'y 153
10. How to remove the Engine Board 153,154
11. How to separate the Operation Panel Block
From Sub Frame Block 155
12. How to remove the Heat Roller Block 155
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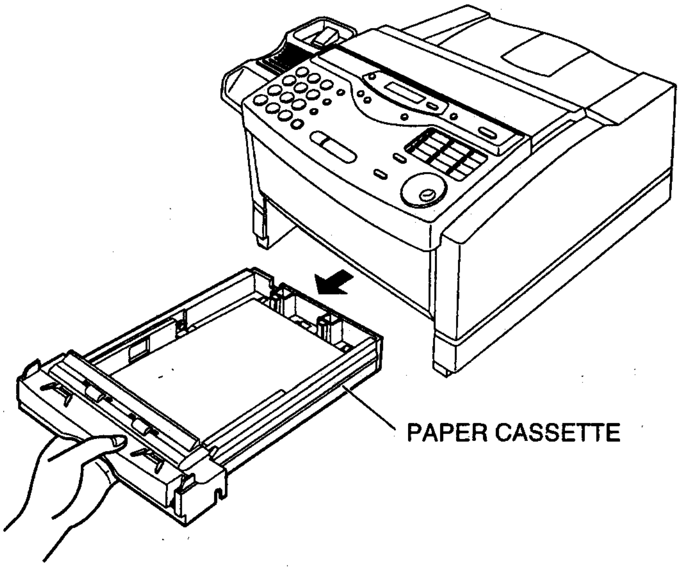
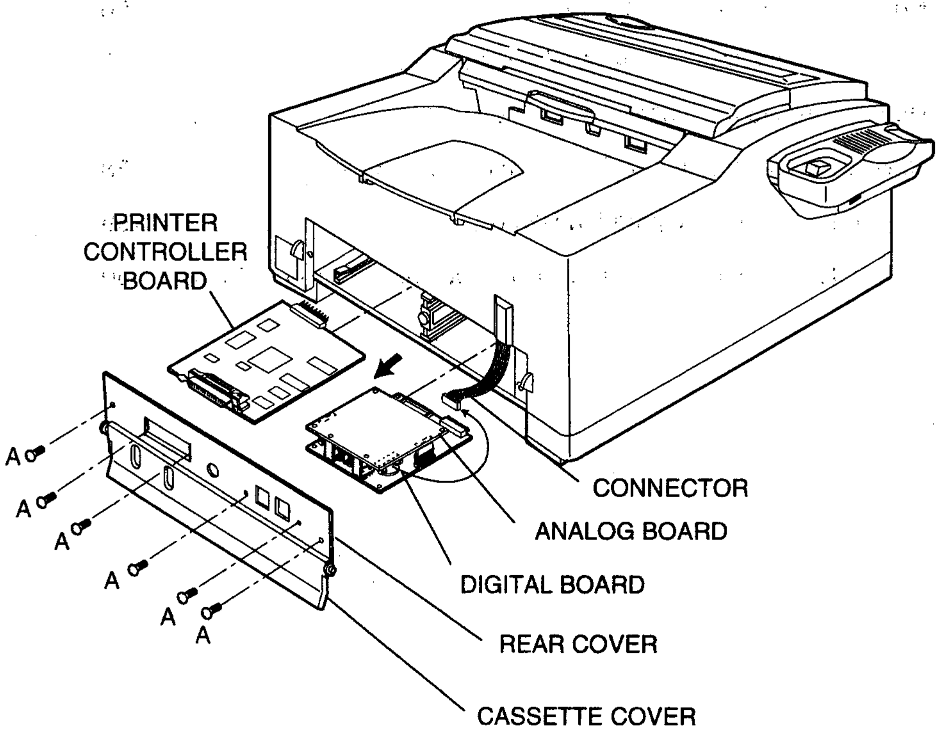
15. How to remove the Rollers 157
16. How to remove the Image Sensor and White Roller 158
17. How to Remove the Oparation Board 159
18. How to Remove the Handset Cradle Block and the Hook Board ... 160

Ref. No. 1	HOW TO REMOVE THE PAPER CASSETTE ,THE PRINTER CONTROLLER BOARD, THE DIGITAL BOARD AND THE ANALOG BOARD
Procedure 1	

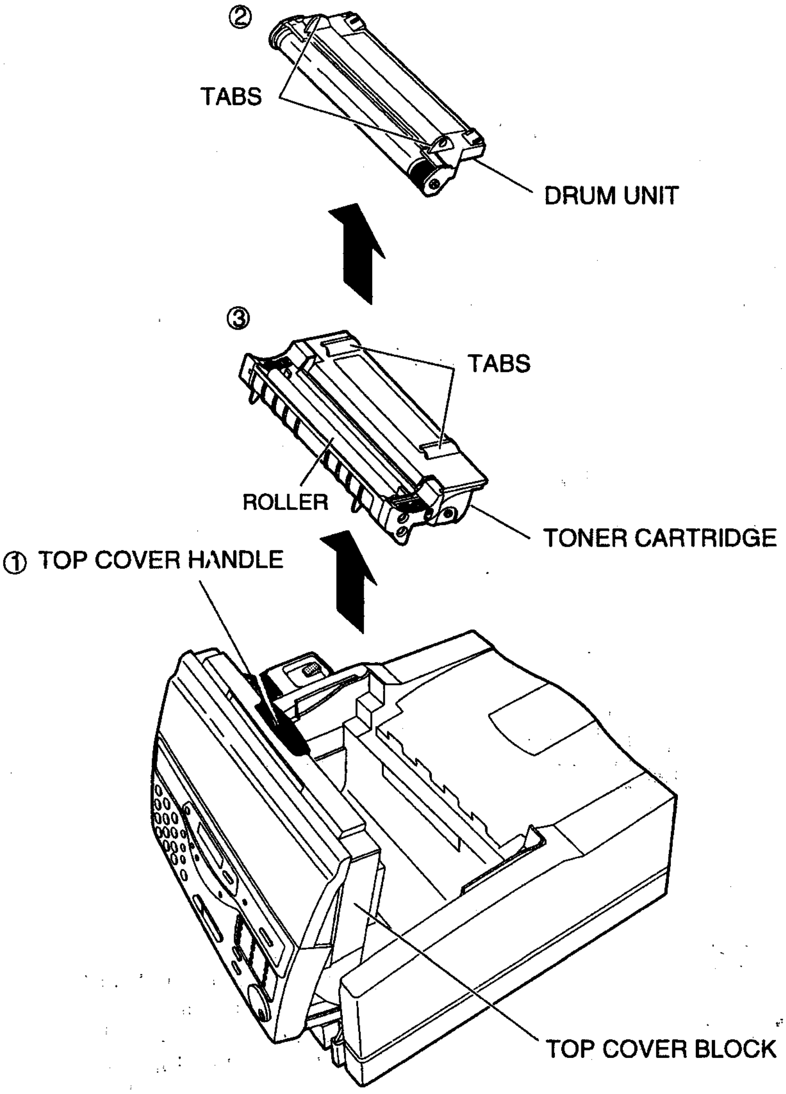
1) Remove the paper cassette.


PAPER CASSETTE

2) Remove the 6 screws (A), then remove the rear cover and the cassette cover.
3) Disconnect the connector, then pull out the digital / analog board and the Printer controller board in the direction indicated by the arrow in the diagram.

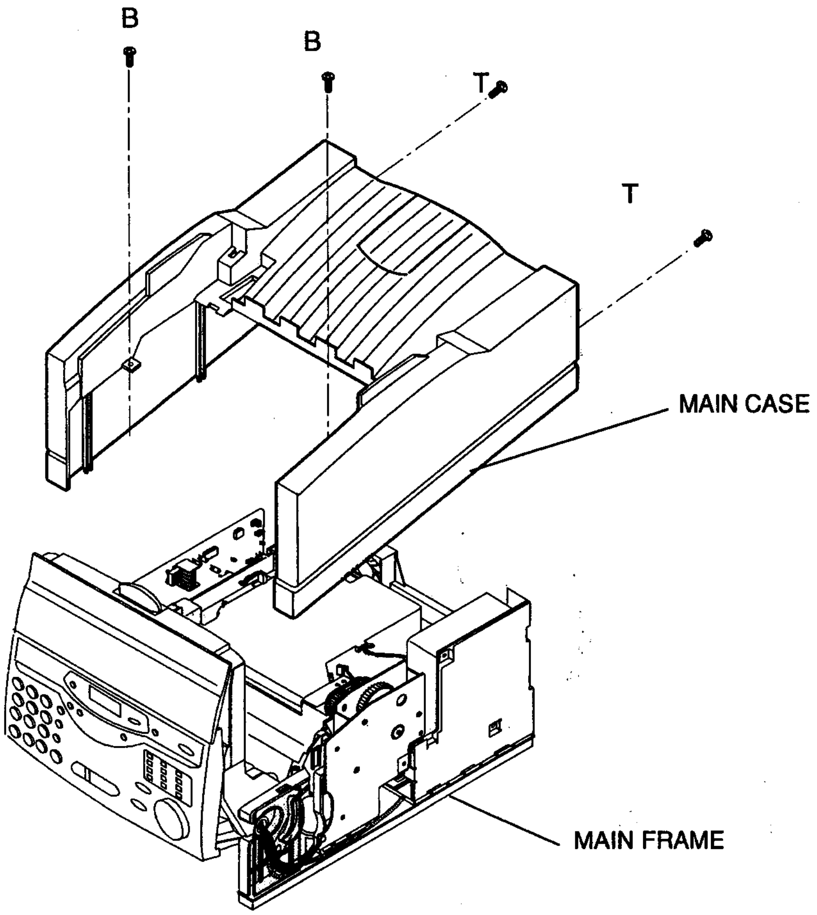

PRINTER CONTROLLER BOARD
A
A
A
A
A
A
CONNECTOR
ANALOG BOARD
DIGITAL BOARD
REAR COVER
CASSETTE COVER

Ref. No. 2	HOW TO REMOVE THE DRUM UNIT AND THE TONER CARTRIDGE.
Procedure 2	1)①Push the top cover handle and pull open the top cover block. 2)②Remove the drum unit by holding the two tabs. 3)③Remove the toner cartridge by holding the two tabs.

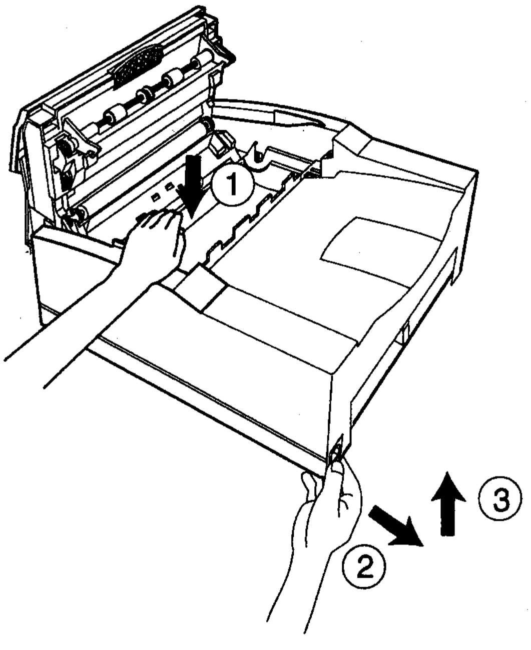

②
TABS
DRUM UNIT
③
TABS
ROLLER
TONER CARTRIDGE
① TOP COVER HANDLE
TOP COVER BLOCK

Ref. No. 3	HOW TO REMOVE THE MAIN CASE
Procedure 2→3	

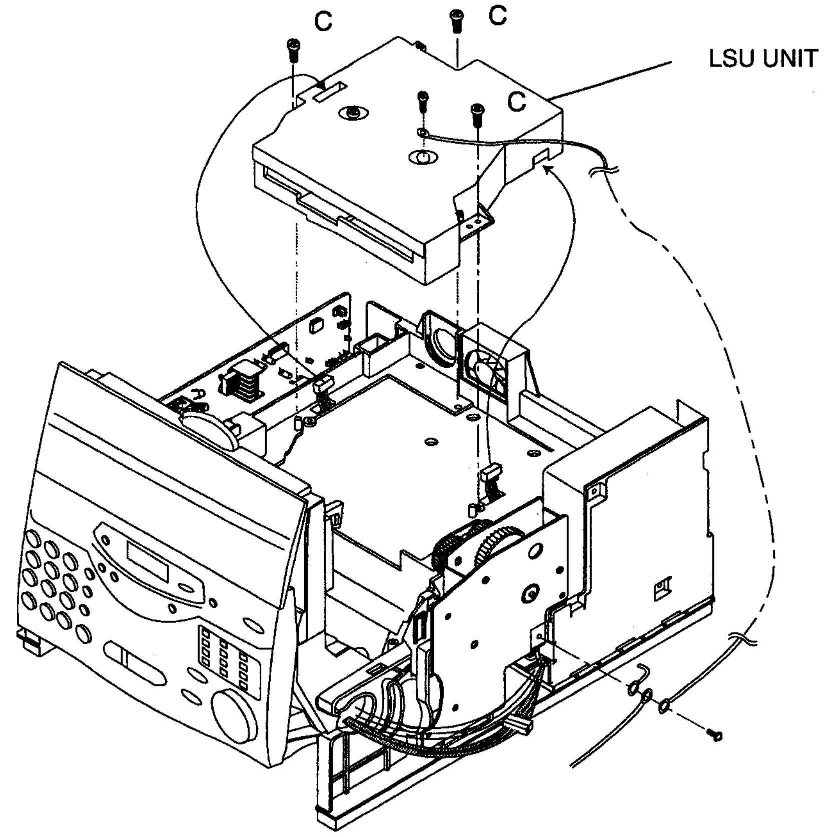
1) Push the cover open button and pull open the operation panel block/ sub frame block.
2) Remove the 2 screws (B) and the 2 screws(T), then remove the main case.



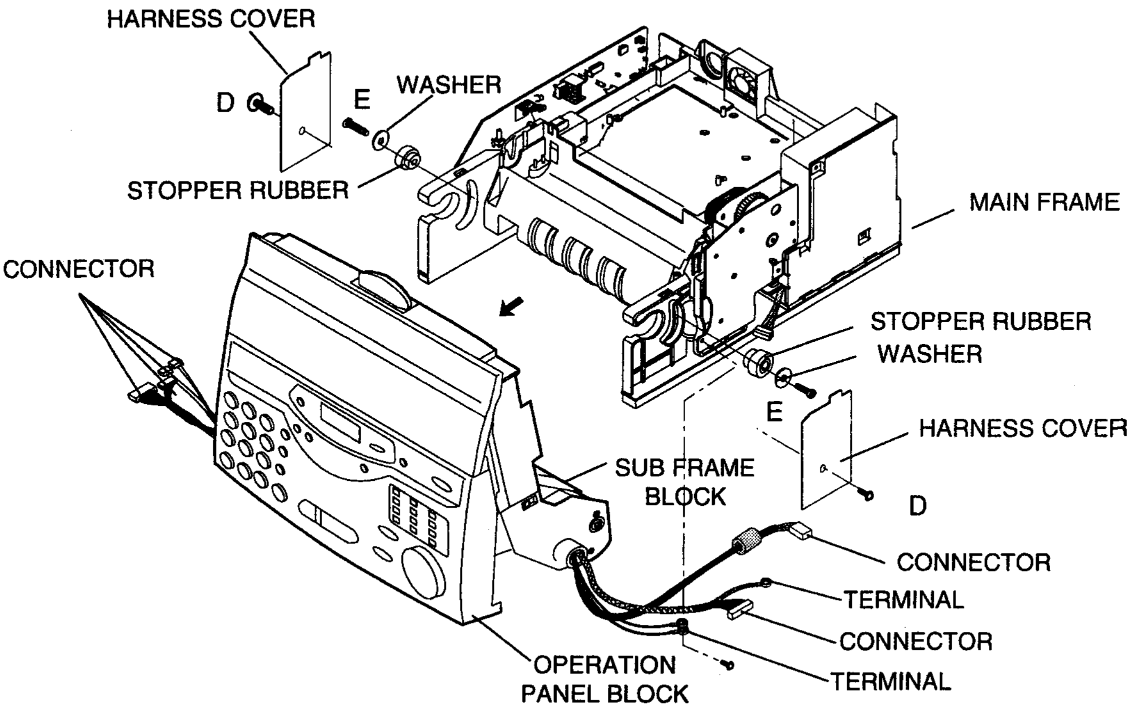
As shown below, while pushing down on the main frame with one hand in the direction indicated by arrow (1), pull the main case with your other hand backward in the direction of arrow (2) and then upward in the direction of arrow (3).



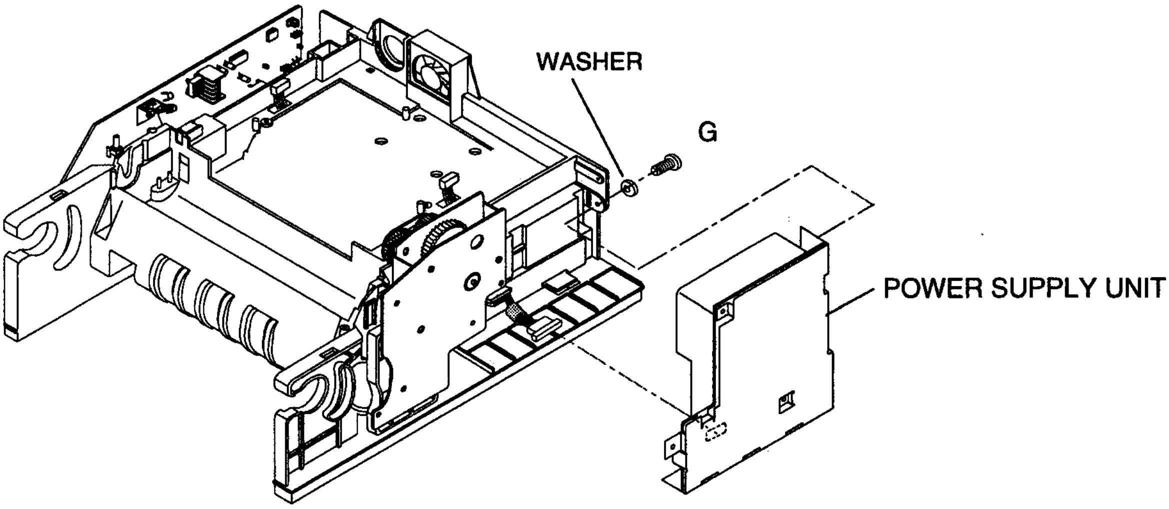
Ref. No. 4	HOW TO REMOVE THE LSU UNIT
Procedure 2→3→4	1) Remove the 3 screws (C), then remove the LSU unit.


C
C
C
LSU UNIT

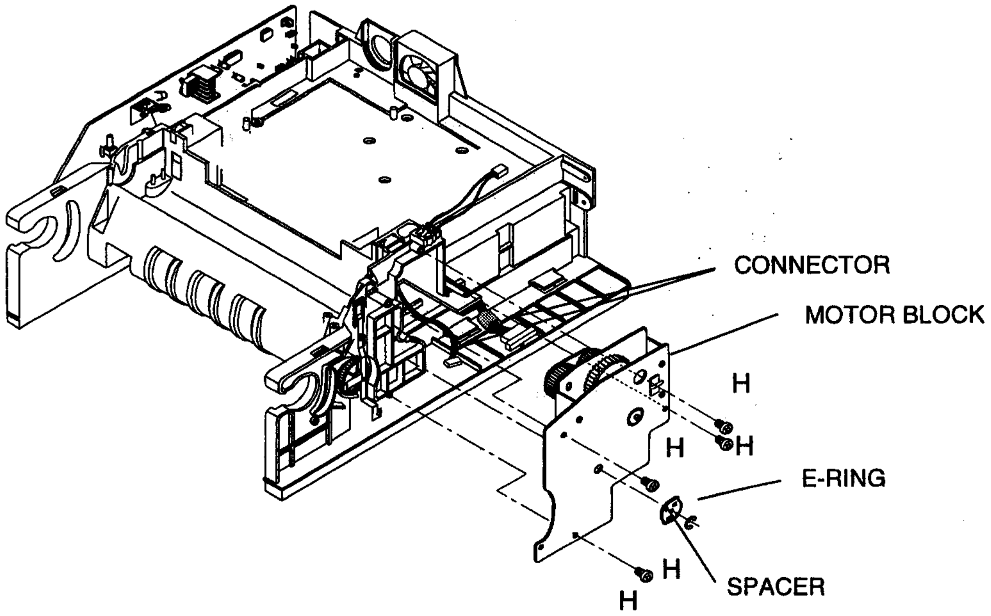
Ref. No. 5	HOW TO REMOVE THE OPERATION PANEL BLOCK / SUB FRAME BLOCK
Procedure 2→3→5	1) As shown below, remove the 1 screw (D) on each side, then remove both harness covers. 2) Disconnect all the connectors and terminals between the sub frame and the main frame. 3) Remove the screw (E), washer and stopper rubber on both sides of the main frame. 4) Pull out the operation cover / sub frame in the direction of the arrow shown in the diagram.


HARNESS COVER
D
E
WASHER
STOPPER RUBBER
CONNECTOR
MAIN FRAME
STOPPER RUBBER
WASHER
E
HARNESS COVER
SUB FRAME BLOCK
D
CONNECTOR
TERMINAL
CONNECTOR
TERMINAL
OPERATION PANEL BLOCK

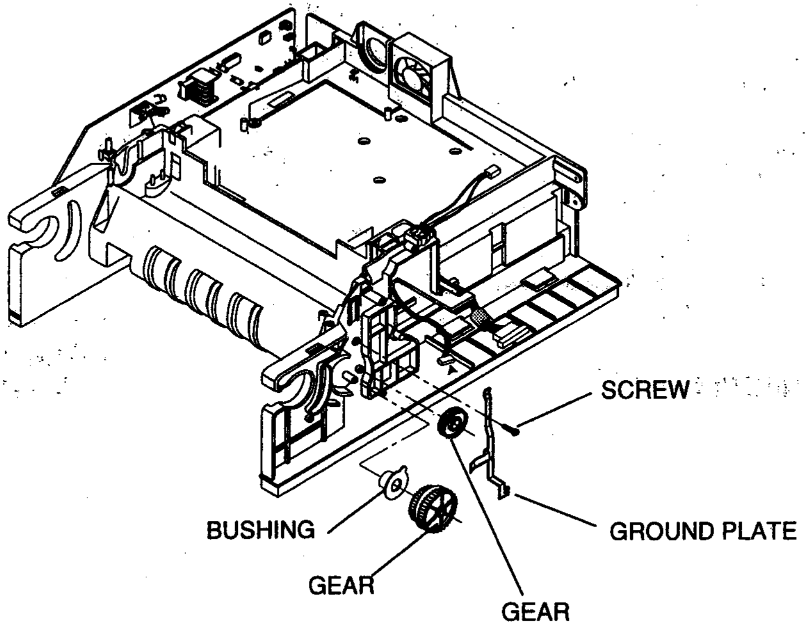
Ref. No. 6	HOW TO REMOVE THE POWER SUPPLY UNIT
Procedure 2→3→5 →6	1) Remove the 1 screw (G) and washer, then remove the power supply unit.


WASHER
G
POWER SUPPLY UNIT

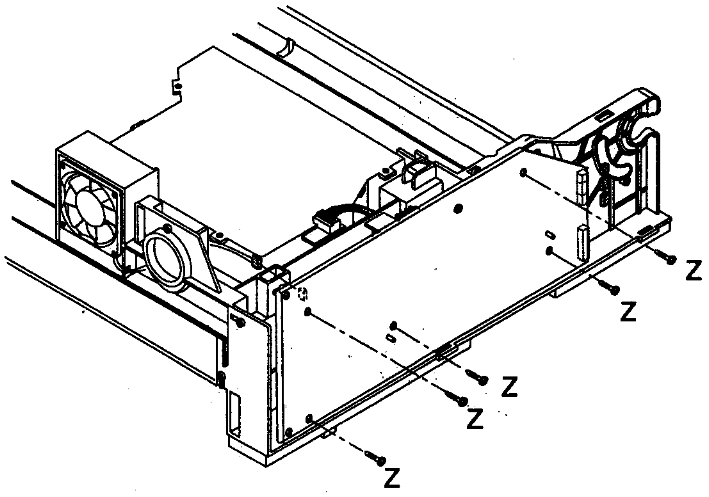
Ref. No. 7	HOW TO REMOVE THE MOTOR BLOCK
Procedure 2→3→5 →6→7	1) Remove the 4 screws (H), E-ring and spacer, disconnect the 2 connectors, and then remove the motor block.


CONNECTOR
MOTOR BLOCK
H
H
H
E-RING
H
H
SPACER

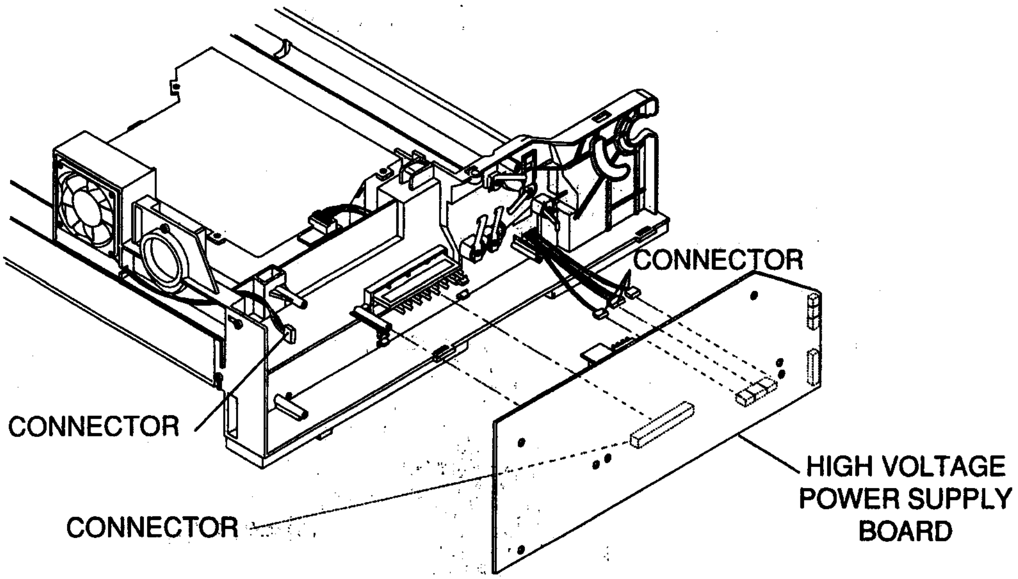
2) Remove the Screw, ground plate, the 2 gears and the spacer.


SCREW
BUSHING
GROUND PLATE
GEAR
GEAR

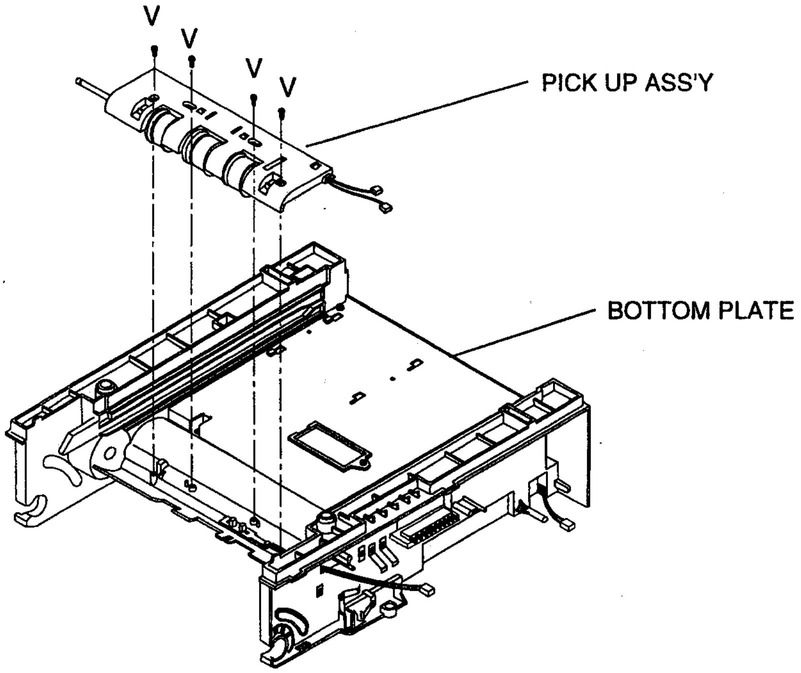
Ref. No.8	HOW TO REMOVE THE HIGH VOLTAGE POWER SUPPLY BOARD
Procedure 2→3→5 →8	1) Remove the 5 screws (Z).



2) Disconnect the 5 connectors, then remove the high voltage power board.

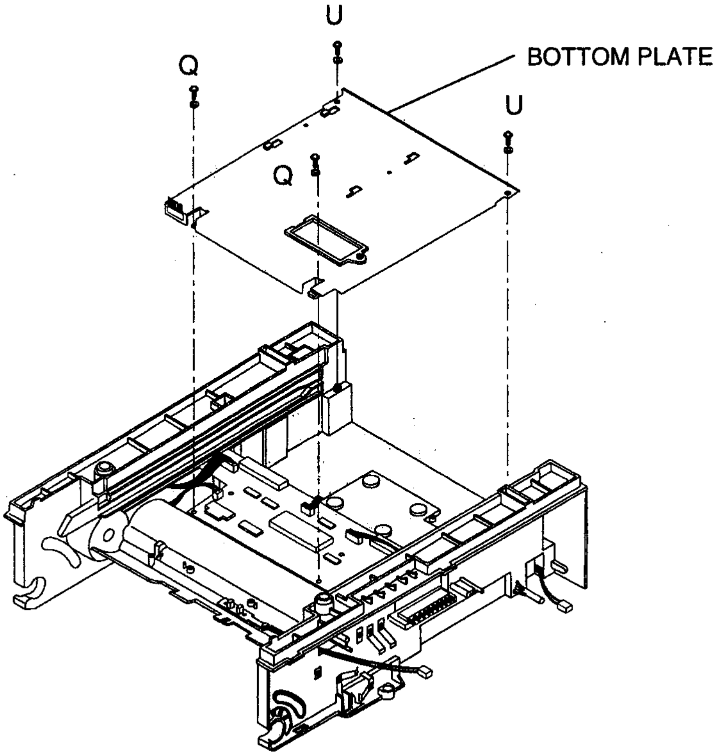

CONNECTOR
CONNECTOR
CONNECTOR
HIGH VOLTAGE
POWER SUPPLY
BOARD

Ref. No9	HOW TO REMOVE THE PICK UP ASS'Y
Procedure 2→3→5→ 7→8→9	1) Remove the 4 screws (V), then remove the pick up assembly.


V
V
V
V
PICK UP ASS'Y
BOTTOM PLATE

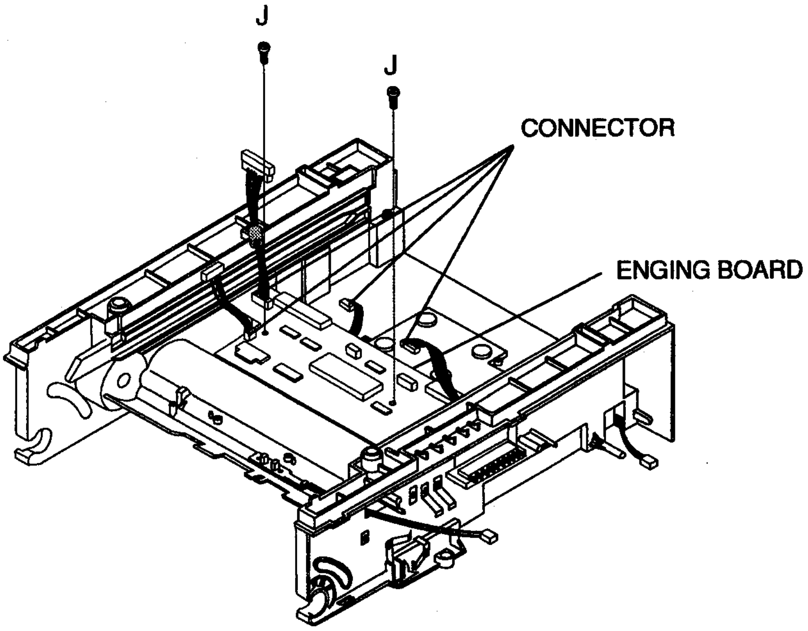
<Bottom Side>

Ref. No. 10	HOW TO REMOVE THE ENGIINE BOARD
Procedure 2→3→5 8→10	1) Remove the 2 screws (Q)and the 2 screws (U), then remove the bottom plate.

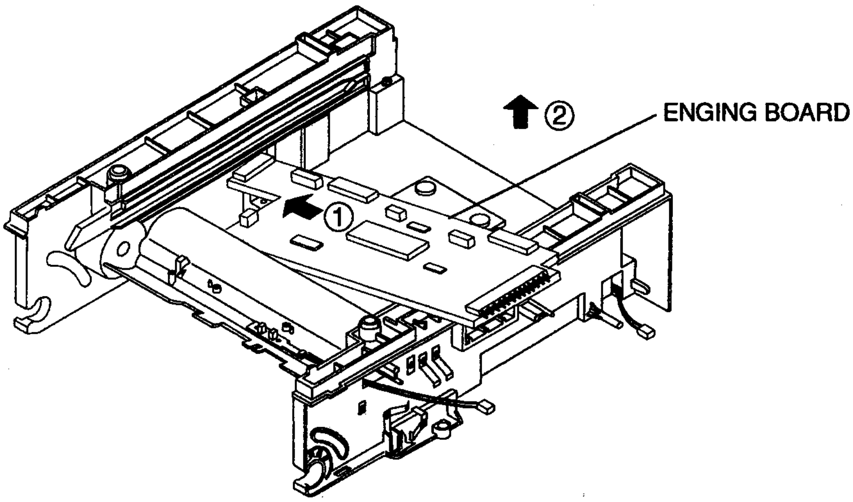

U
Q
BOTTOM PLATE
U
Q

<Bottom Side>

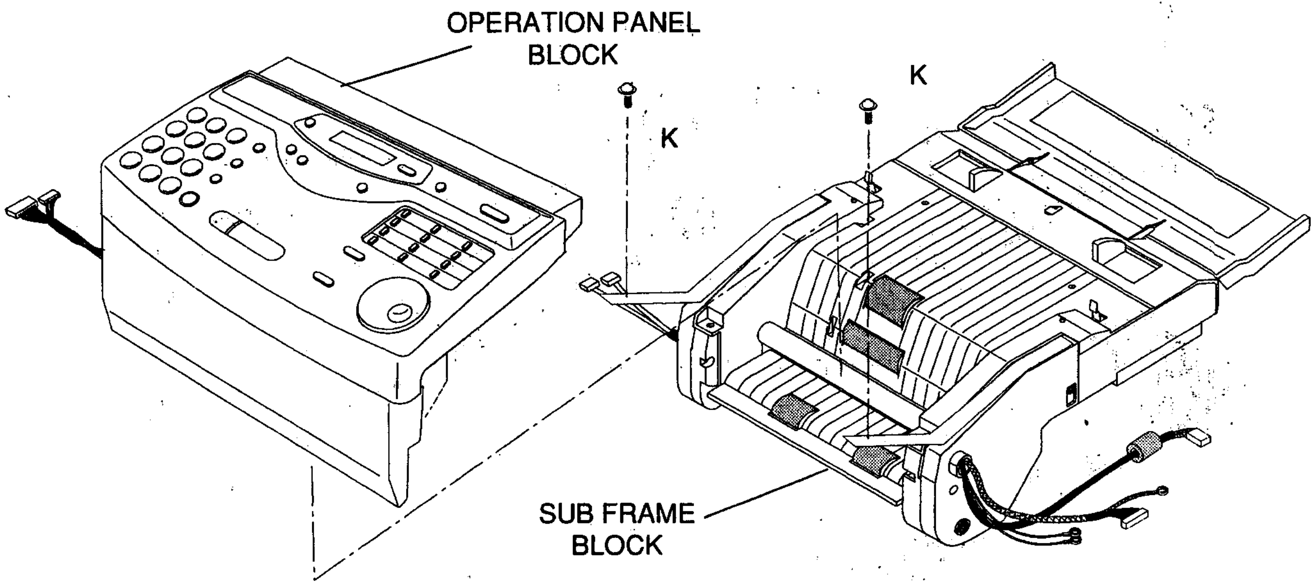
2) Remove the 2 screws (J) and disconnect the 4 connectors.


J
J
CONNECTOR
ENGING BOARD

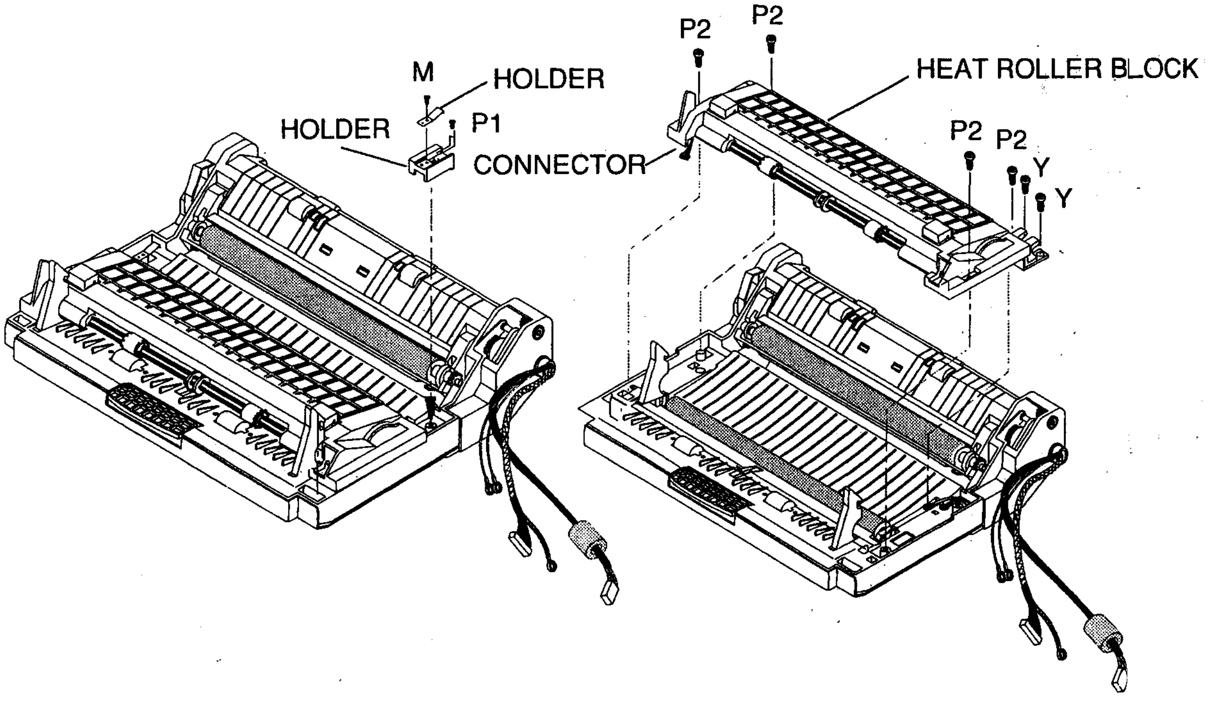
3) Push the engine board in the direction of arrow (1), then lift it up in the direction of arrow (2).


②
①
ENGING BOARD

Ref. No. 11	HOW TO SEPARATE THE OPERATION PANEL BLOCK FROM SUB FRAME BLOCK
Procedure 2→3→11	1) Remove the 2 screws (K), then remove the operation panel block from the sub frame block.


OPERATION PANEL BLOCK
K
K
SUB FRAME BLOCK

Ref. No. 12	HOW TO REMOVE THE HEAT ROLLER BLOCK
Procedure 2→3→11 →12	1) Remove the 1 screw (M) and 2 screws (P1), then remove the holder and plate. 2) Remove the 4 screws (P2) ,2 screws (Y) and disconnect the connector, then remove the heat roller block.

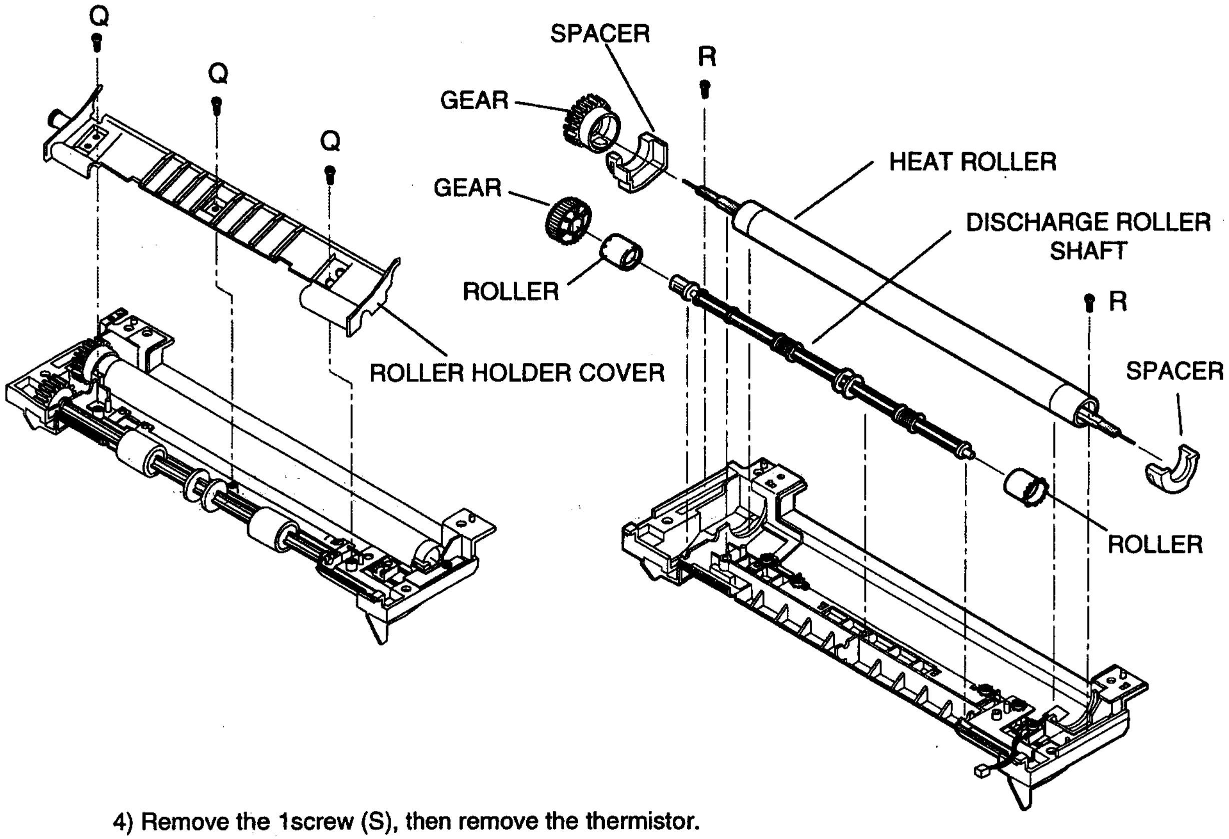

P2
P2
M
HOLDER
HEAT ROLLER BLOCK
HOLDER
P1
P2
P2
CONNECTOR
Y
Y

Ref. No.13

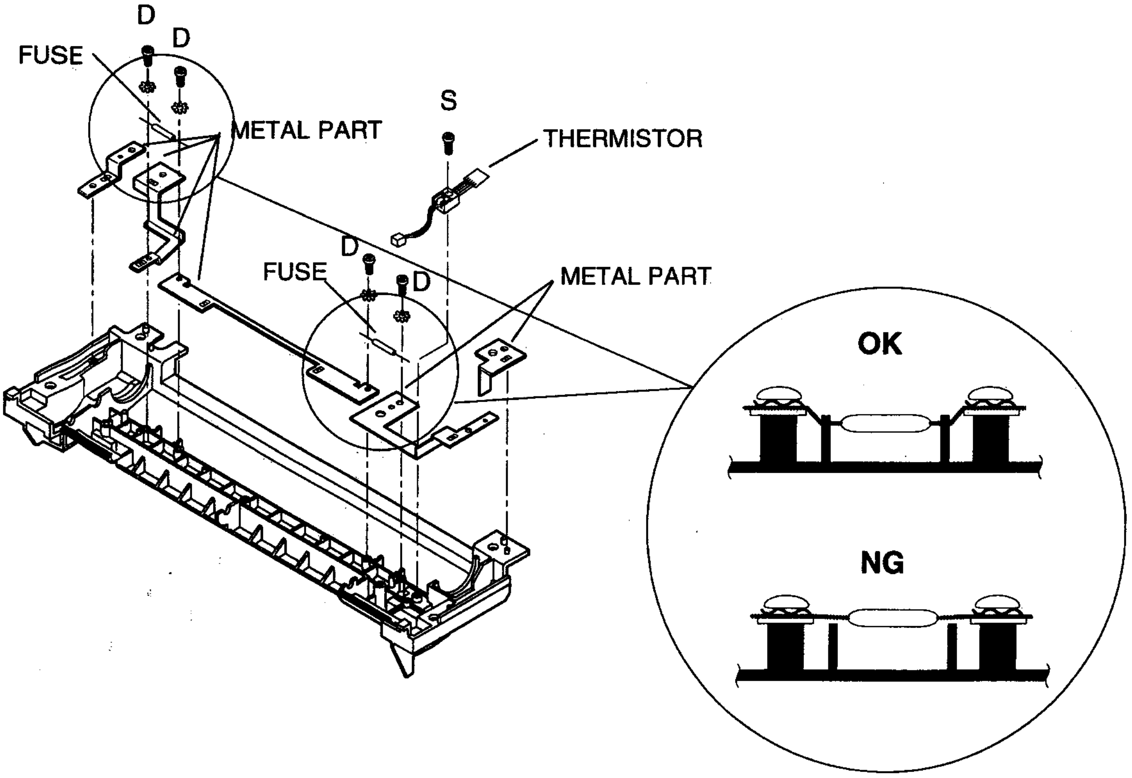
HOW TO REMOVE THE HEAT ROLLER

Procedure
2→3→11
→12→13

1) Remove the 3 screws (Q), then remove the roller holdor cover.
2) Remove the discharge roller, two rollers and a gear.
3) Remove the 2 screws (R), then remove the heat roller, then remove the spacers and a gear


Q
Q
Q
SPACER
R
GEAR
GEAR
HEAT ROLLER
DISCHARGE ROLLER SHAFT
ROLLER
R
ROLLER HOLDER COVER
SPACER
ROLLER

4) Remove the 1screw (S), then remove the thermistor.
5) Remove the 4 screws and washers(D), then remove the two fuses and the metal parts.

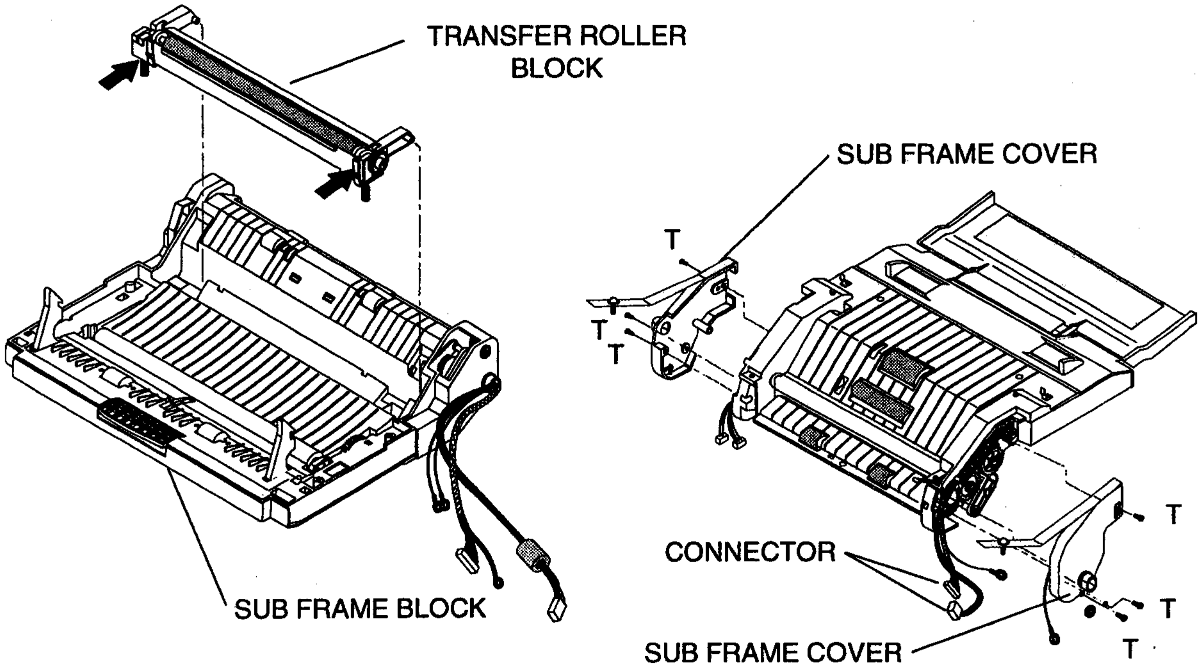

D
D
FUSE
METAL PART
S
THERMISTOR
D
FUSE
D
METAL PART
OK
NG

Ref. No. 14

HOW TO REMOVE THE TRANSFER ROLLER BLOCK

Procedure
2→3→7→12
→13→14

1) Press the catches in the direction indicated by the arrows, then lift up the transfer roller block.
2) Remove the 6 screws (T) and disconnect the connectors, then remove the sub frame cover from both sides.

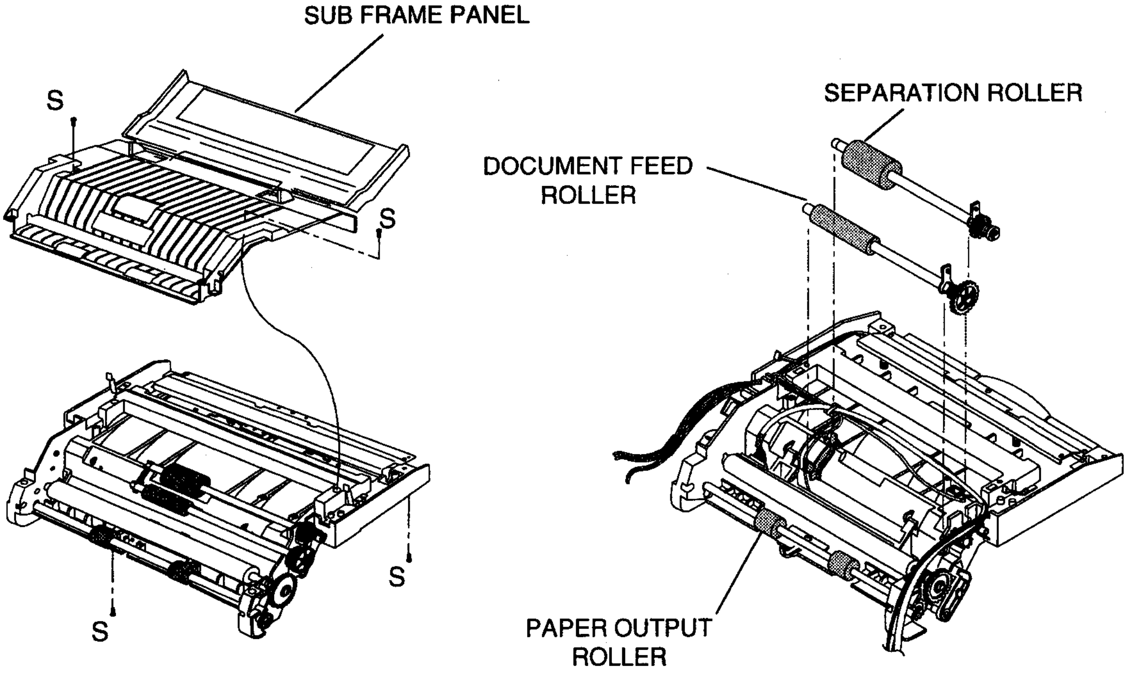

TRANSFER ROLLER BLOCK
SUB FRAME BLOCK
SUB FRAME COVER
T
T
T
T
T
T
CONNECTOR
SUB FRAME COVER

Ref. No. 15

HOW TO REMOVE THE ROLLERS

Procedure
2→3→5→
11→12→13
→14→15

1) Remove the 4 screws (S), then remove the sub frame panel.
2) Remove the document feed roller and seperation roller.


SUB FRAME PANEL
S
S
S
S
SEPARATION ROLLER
DOCUMENT FEED ROLLER
PAPER OUTPUT ROLLER

Ref. No. 16	HOW TO REMOVE THE IMAGE SENSOR AND WHITE ROLLER (SCAN ROLLER)
Procedure 2→3→7→12 →13→14→ 15→16→17	1) Remove the E-ring, gears, spring and spacer on each sides, then remove the reading roller. 2) Remove the image sensor.

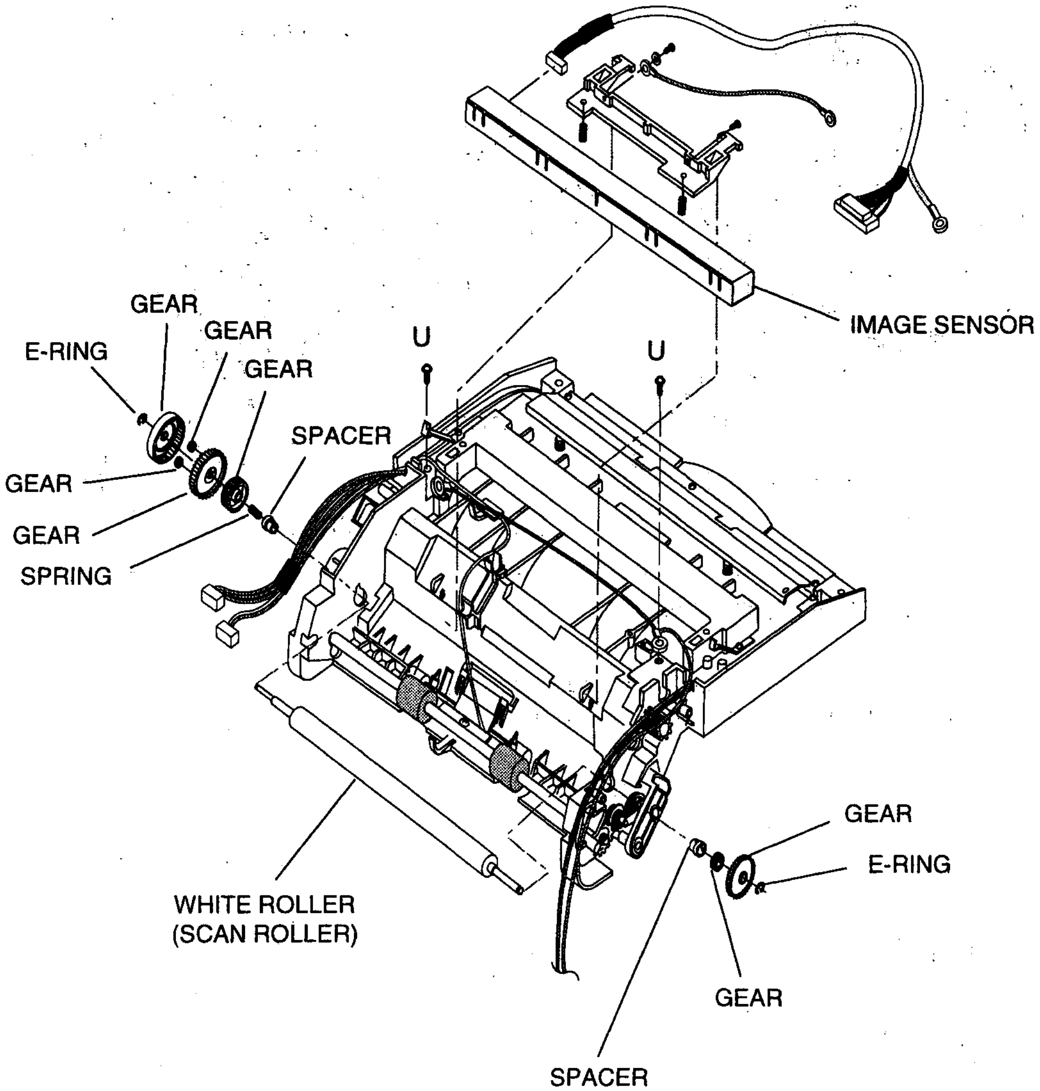
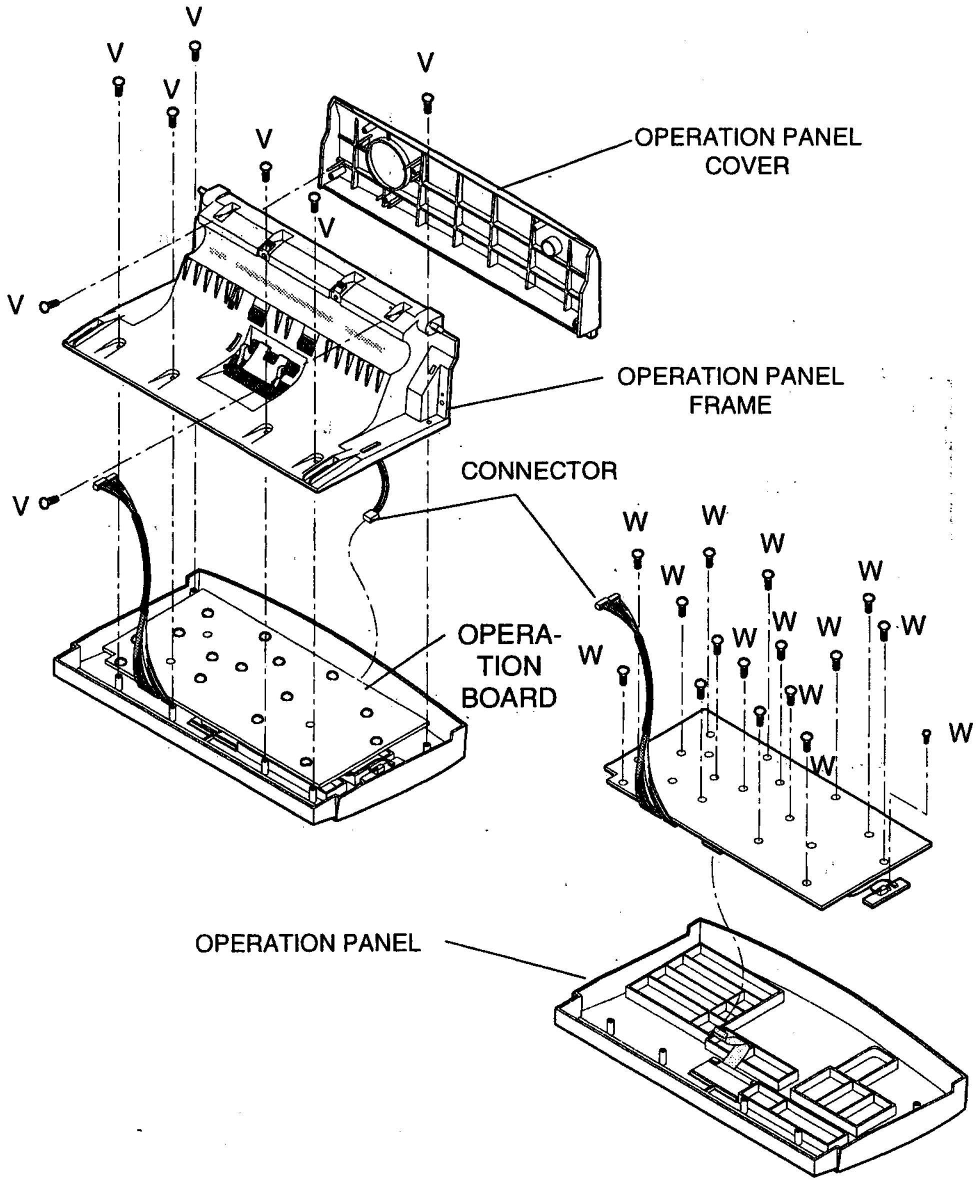
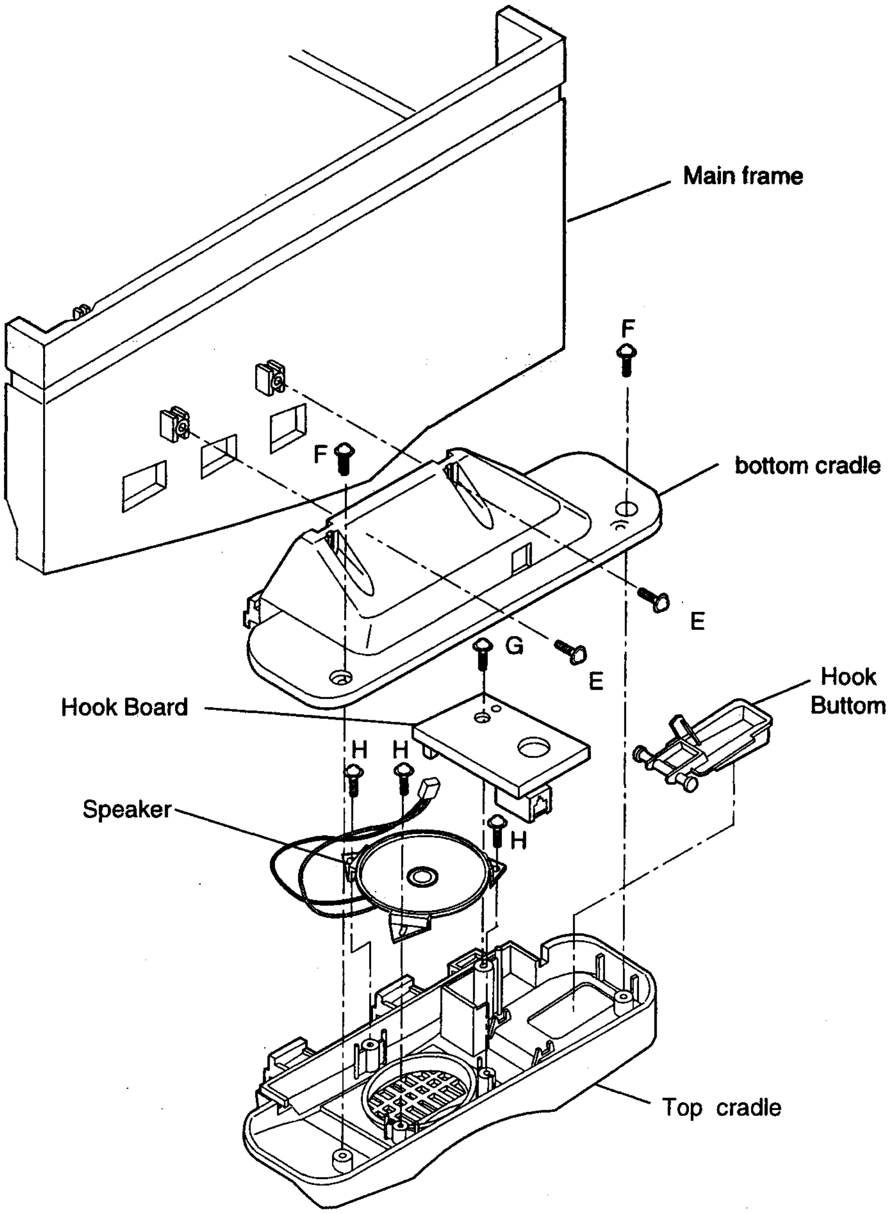


IMAGE SENSOR
GEAR
GEAR
E-RING
GEAR
U
U
SPACER
GEAR
GEAR
SPRING
WHITE ROLLER
(SCAN ROLLER)
GEAR
E-RING
GEAR
SPACER

Ref. No. 16	**HOW TO REMOVE THE OPARATION BOARD**
Procedure 2→3→11 →17	1) Remove the 8 screws (V), then remove the operation panel cover from the operation panel frame. 2) Remove the 16 screws (W) and disconnect the 2 connectors, then remove the operation board.


V
V
V
V
V
V
V
V
OPERATION PANEL COVER
OPERATION PANEL FRAME
CONNECTOR
OPERA-TION BOARD
W
OPERATION PANEL

Ref. No. 18	HOW TO REMOVE THE HANDSET CRADLE BLOCK AND THE HOOK BOARD
Procedure 18	1) Remove the 2 screws (E), then remove the handset cradle block. 2) Remove the 2 screws (F), then remove the top cradle from the bottom cradle. 3) Remove the 1 screw (G),rhen remove the hook board and the hook bittom. 4) Remove the 3 screw (H),rhen remove the speaker.


Main frame
F
F
bottom cradle
E
G
E
Hook Board
Hook
Buttom
H
H
Speaker
H
Top cradle

HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example, SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount), a soldering iron and cutter knife, you can easily remove the ICs even if there are more than 100 pins.

1. PREPARATION

- SOLDER - - - - - - - - Sparkle Solder 115A-1, 115B-1
  OR
  Almit Solder KR-19, KR-19RMA
- Soldering iron - - - - - Recommended power consumption is between 30 W to 40 W.
  Temperature of Copper Rod 662 ± 50 °F (350 ±10℃)

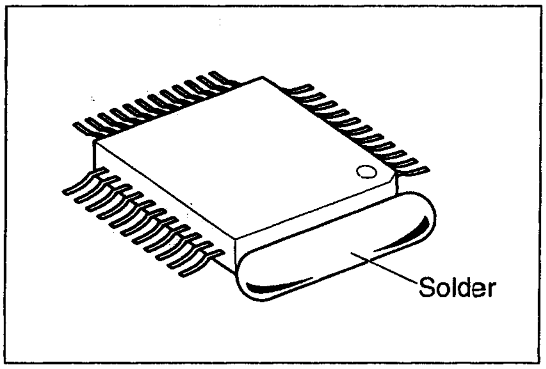
  (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)
- Flux - - - - - - - - - - - HI115 Specific gravity 0.863

  (Original flux should be replaced daily.)

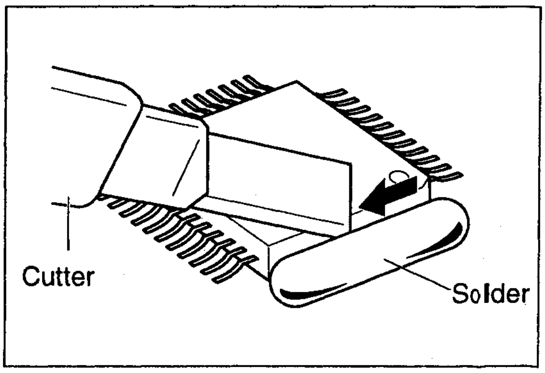
2. FLAT PACKAGE IC REMOVAL PROCEDURE

1) When all of the IC leads cannot been seen at the standard degree, fill with large quantities of solder.

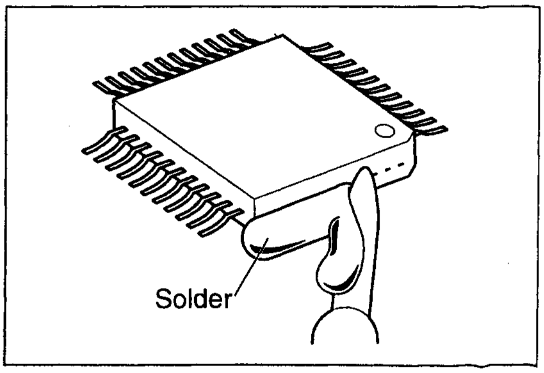
Note:
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C. board's pattern. If you do not fill with large quantities of solder as in step 1, the P.C. board pattern may be removed.



2) Using a cutter, cut the lead at the source.
(Cut the contents with a cutter lightly, 5 or 6 times.)

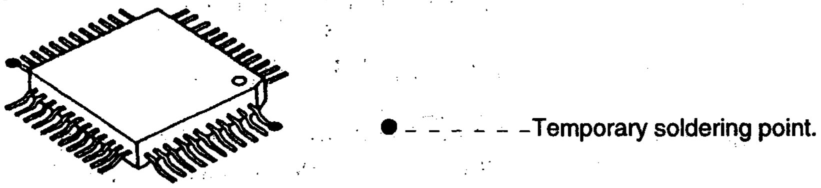


3) Remove when the solder melts.
(Remove the lead at the same time.)



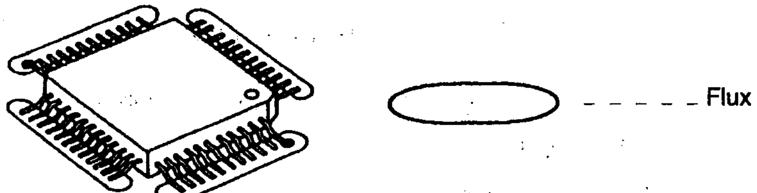
After removing the Flat IC and when attaching a new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.



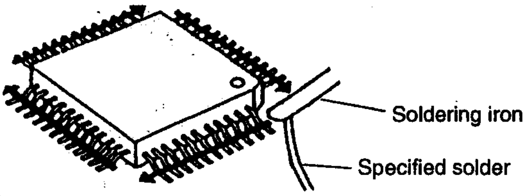
*Check the accuracy of the IC setting with the corresponding soldering foil.

2) Apply flux to all pins of the FLAT PACKAGE IC.



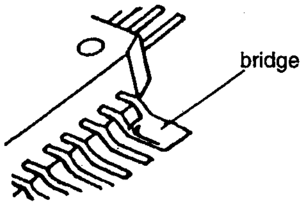
3. FLAT PACKAGE IC INSTALLATION PROCEDURE

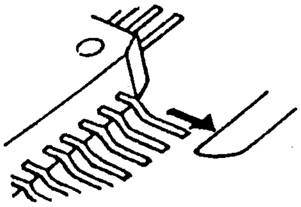
3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



1) Lightly resolder the bridged portion.

2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.





LBP TECHNICAL PRINCIPLE

1. P.C.B.Location 164
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3. Electric Operation Principle 166
4. Rollers Operation 167
5. Printing Operation Principle 169
    5.1. Paper Sensor 170
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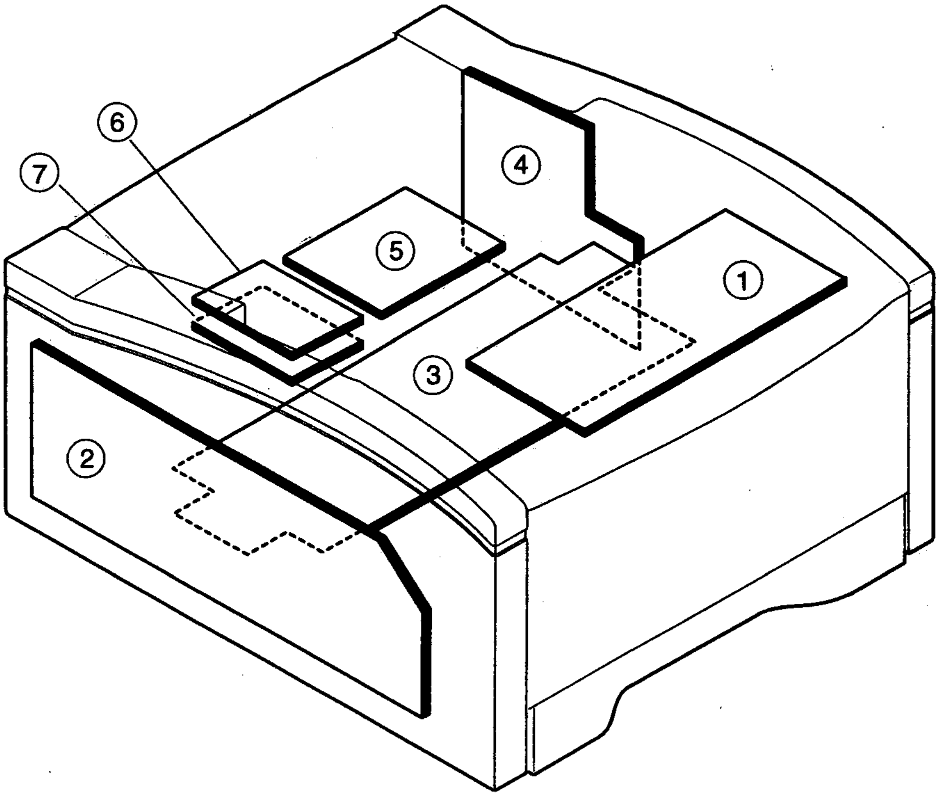
    5.3. Charging 171
    5.4. Exposing 171
    5.5. Developing 172
    5.6. Transcription 172
    5.7. Cleaning 173
    5.8. Fixing 173
    5.9. Image Reading 175

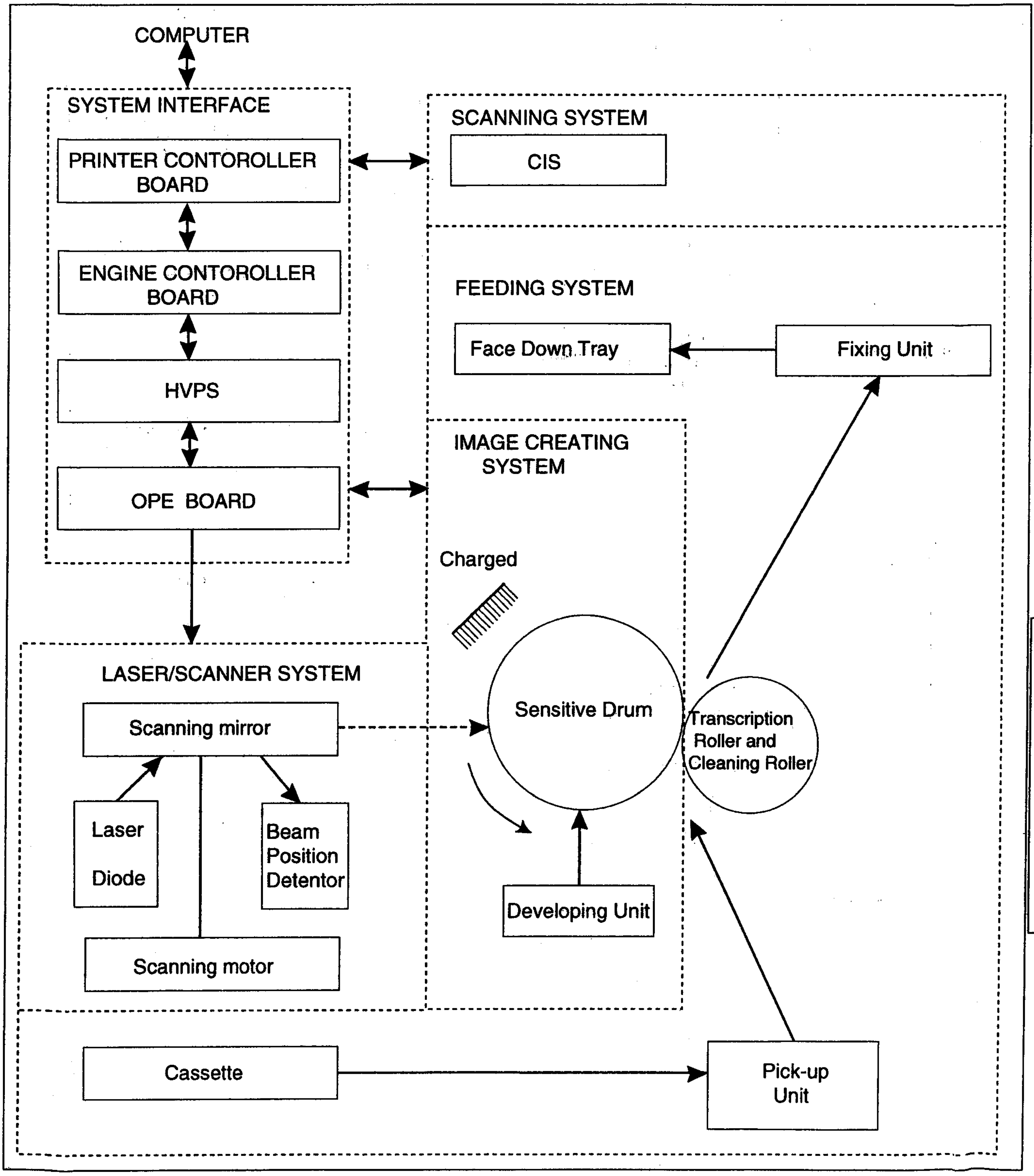
1. P.C.B LOCATION



① Operation Panel Board
② High Voltage Power Supply
③ Engine Controller Board
④ SMPS
⑤ Printer Controller Board
⑥ Analog Board
⑦ Digital Board

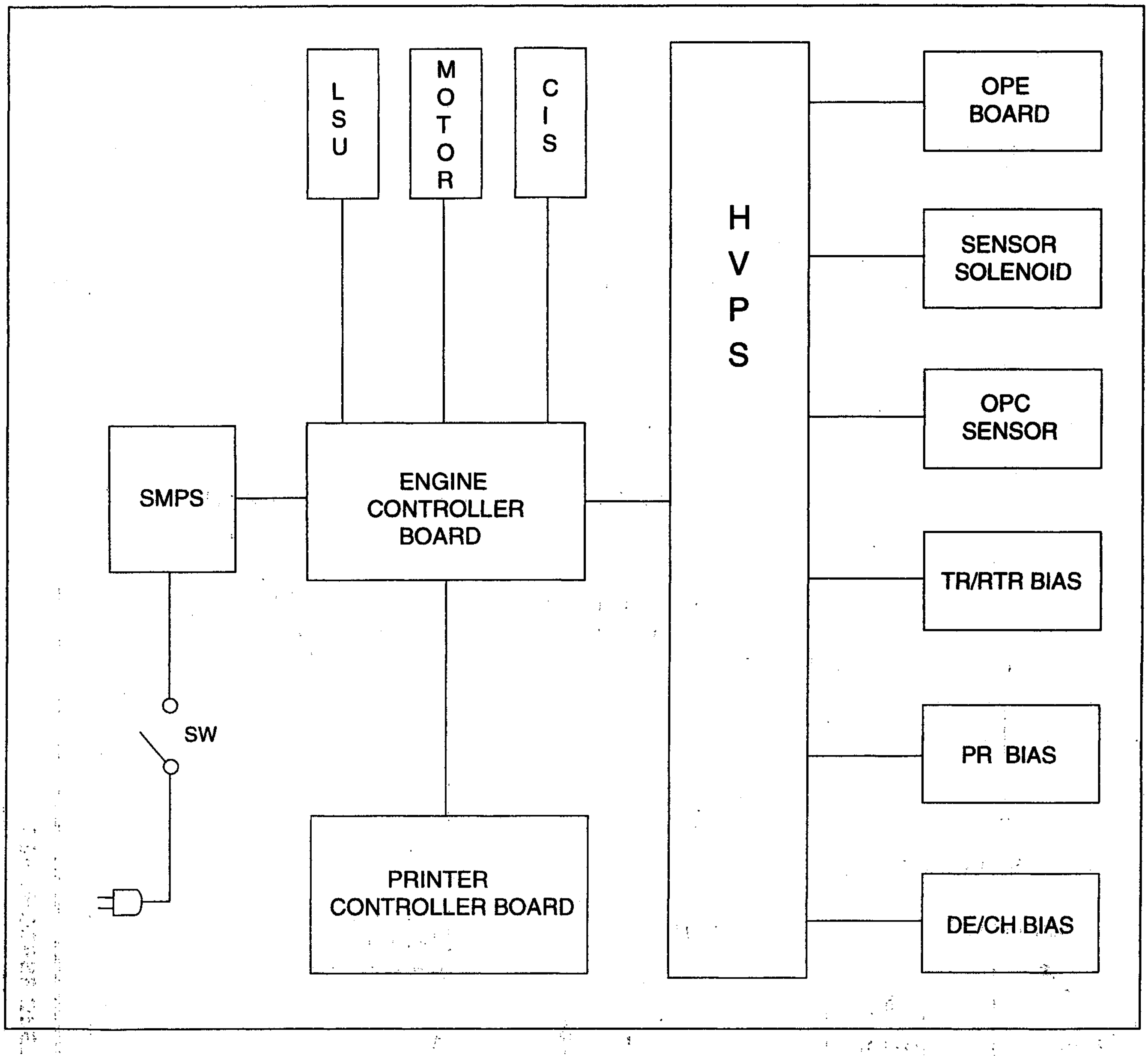
2. PRINTER OPERATION PRINCIPLE (Printer Block Diagram)

The function of the unit provided with the printer consists of the system interface, image creating system, laser/scanner system, feeding system and scanning system.Face Down Tray


COMPUTER
SYSTEM INTERFACE
PRINTER CONTOROLLER BOARD
ENGINE CONTOROLLER BOARD
HVPS
OPE BOARD
SCANNING SYSTEM
CIS
FEEDING SYSTEM
Face Down Tray
Fixing Unit
IMAGE CREATING SYSTEM
Charged
Sensitive Drum
Transcription Roller and Cleaning Roller
Developing Unit
LASER/SCANNER SYSTEM
Scanning mirror
Laser Diode
Beam Position Detentor
Scanning motor
Cassette
Pick-up Unit

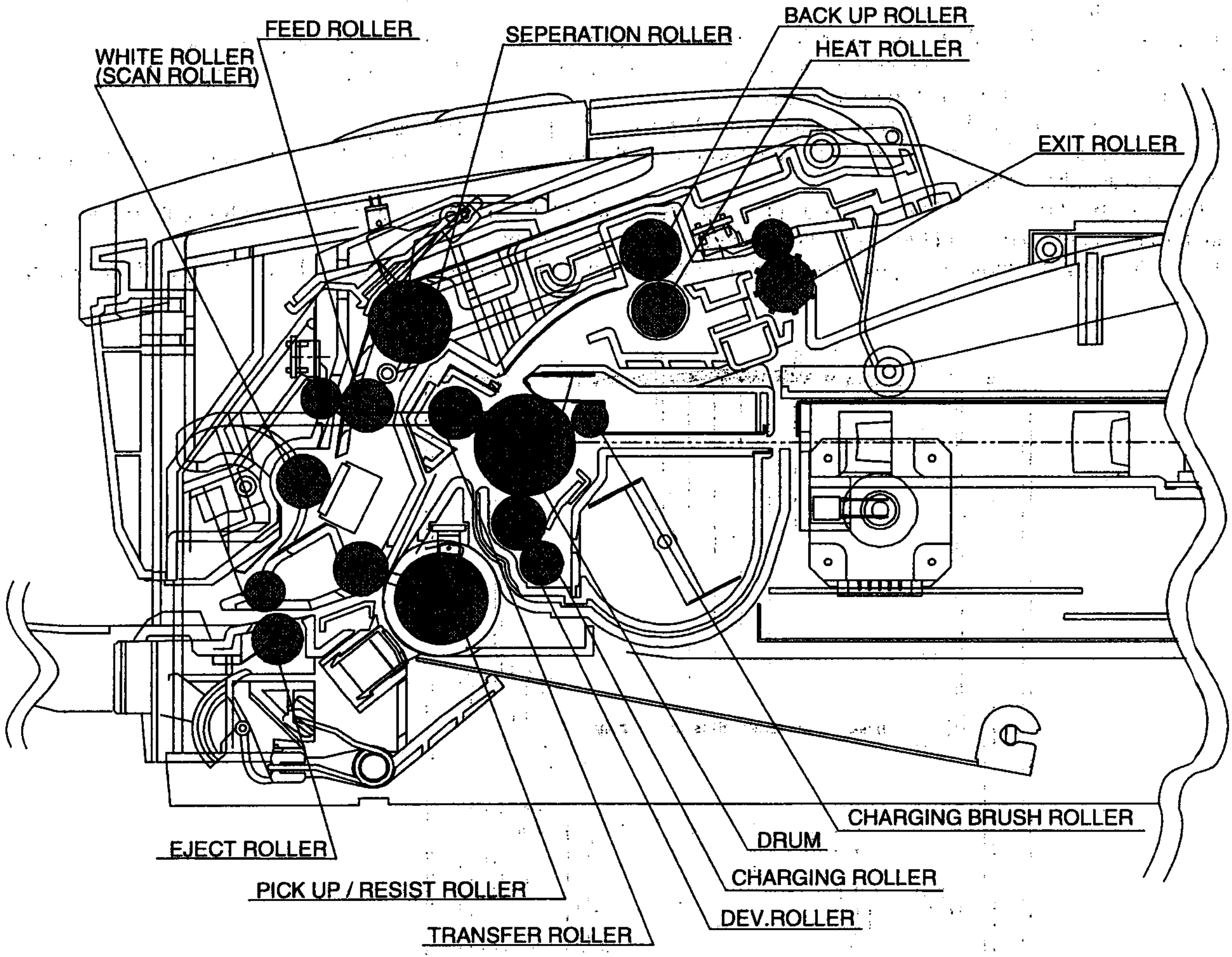
3. ELECTRIC OPERATION PRINCIPLE (Electric Block Diagram)

The operation of the printer block is controlled by the microprocessor on the printer controller. The external image data is processed while the printer is on-line, and the scan and copy are available.


LSU
MOTOR
CIS
HVPS
OPE BOARD
SENSOR SOLENOID
OPC SENSOR
TR/RTR BIAS
PR BIAS
DE/CH BIAS
SMPS
ENGINE CONTROLLER BOARD
SW
PRINTER CONTROLLER BOARD

4. ROLLERS OPERATION

ROLLERS LOCATION


FEED ROLLER
WHITE ROLLER (SCAN ROLLER)
SEPERATION ROLLER
BACK UP ROLLER
HEAT ROLLER
EXIT ROLLER
CHARGING BRUSH ROLLER
DRUM
CHARGING ROLLER
DEV.ROLLER
EJECT ROLLER
PICK UP / RESIST ROLLER
TRANSFER ROLLER

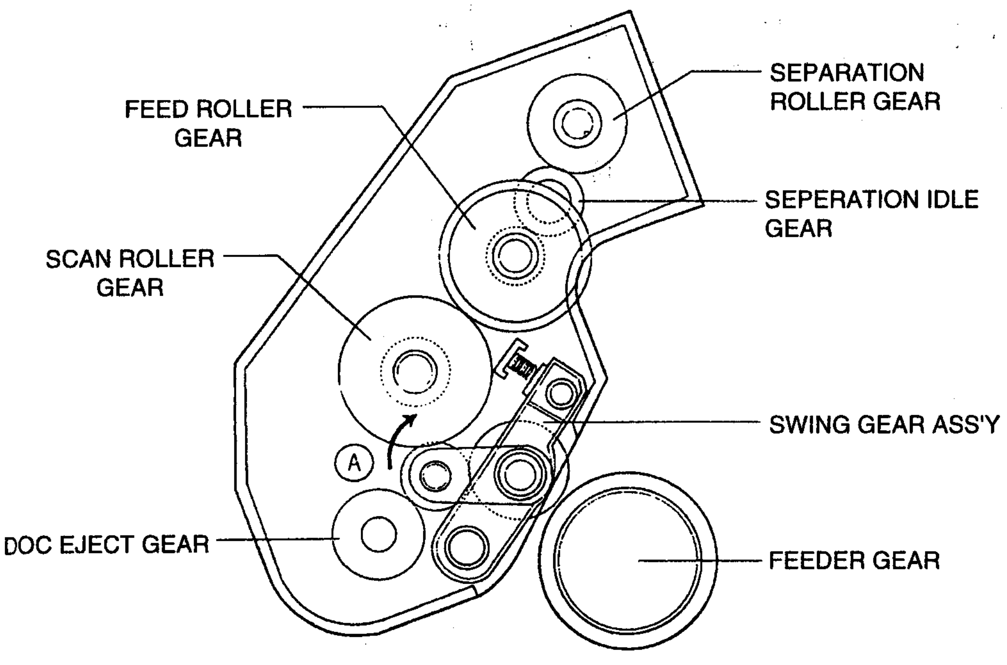

FEED ROLLER GEAR
SEPARATION ROLLER GEAR
SEPERATION IDLE GEAR
SCAN ROLLER GEAR
SWING GEAR ASS'Y
A
DOC EJECT GEAR
FEEDER GEAR

Fig (a)

This combination printer is operated by a single motor and is designed so that copying and printing can be performed at the same time. As shown in Fig.(a),the main motor is driven forward and backward,with printing possible when it is driven forward and scanning possible when it is driven backward.

When printing is performed,as Fig.(a) shows, the swing gear is connected to the eject roller, so printing is possible,but when the document is fed during copying, the main motor is driven in the reverse direction and the swing gear moves in direction (A) .At this time,the rollers linked to the ADF provide the drive force.

When copying starts,the main motor is driven forward in order to pick up the paper is picked up.

The Sepeeration roller is driven forward by the main motor and when the fax solenoid comes ON,the eject roller and scan roller on the left side are driven simultaneously.

Fig.(b) shows the movement direction of the drive power.in the case of direction(A),the fax solenoid turns OFF during printing, so the seperation roller is not driven and the seperation roller feeds the document.

For initial document feeding, the main motor rotates in the reverse direction while receiving drive in direction (B) and feeding the document.

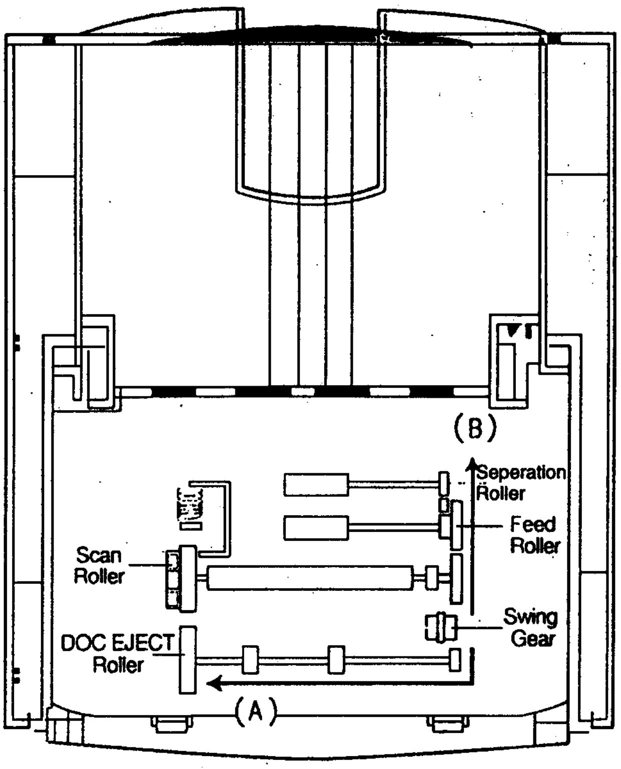
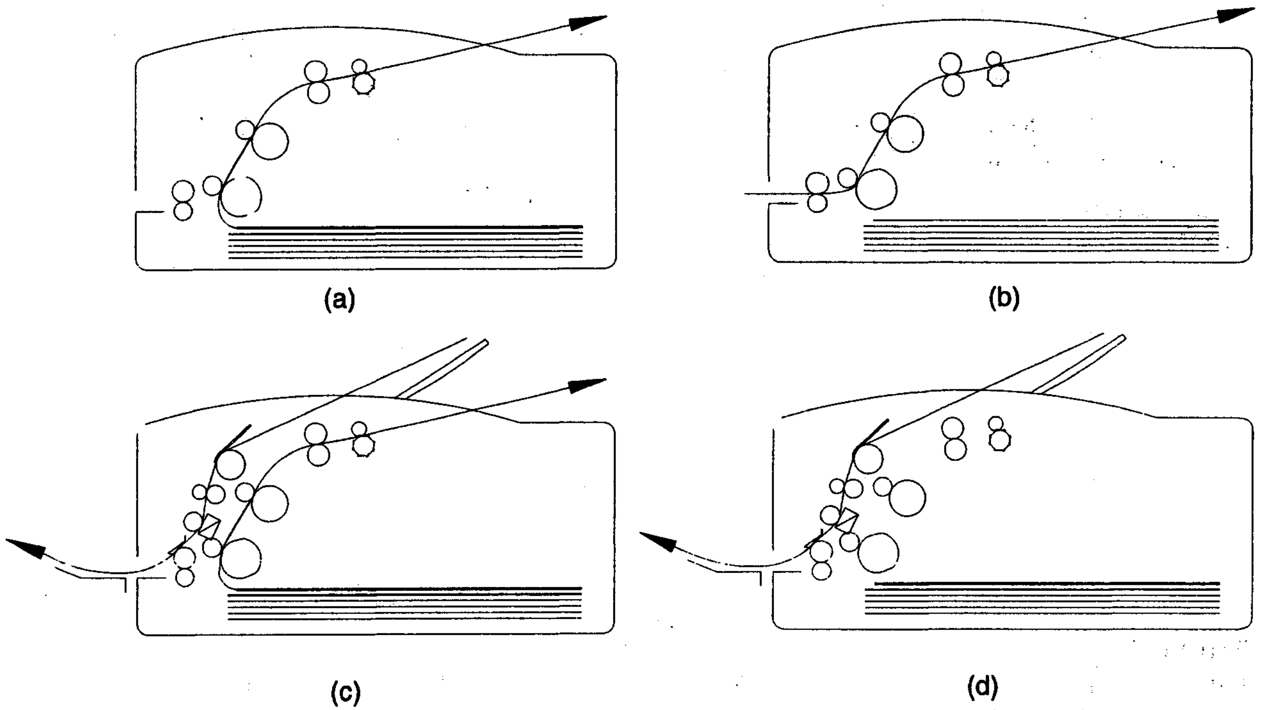


Fig (b)

5. PRINTING OPERATION PRINCIPLE

When the unit provided with the printer, the paper is carried passing the following route.
(a) When feeding with the cassette.
(b) When manual feeding.
(c) When copying.
(d) When scanning.

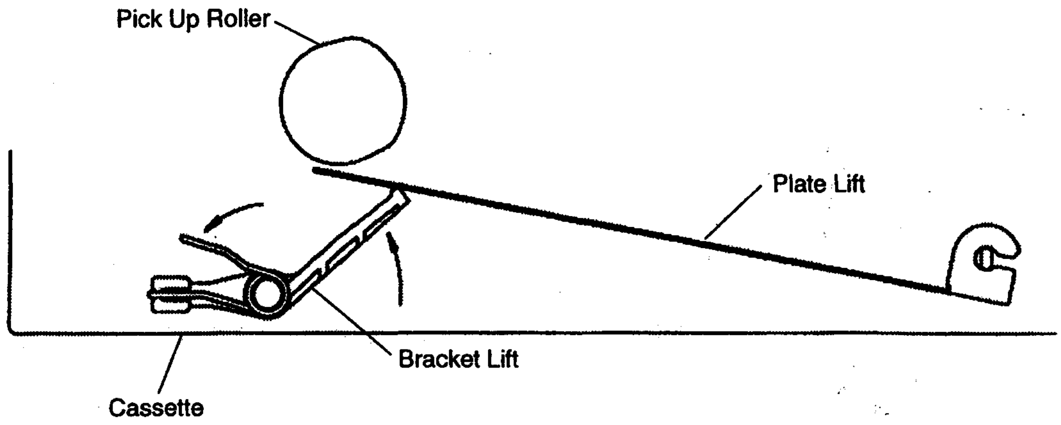
Paper Path



(a) (b)

(c) (d)

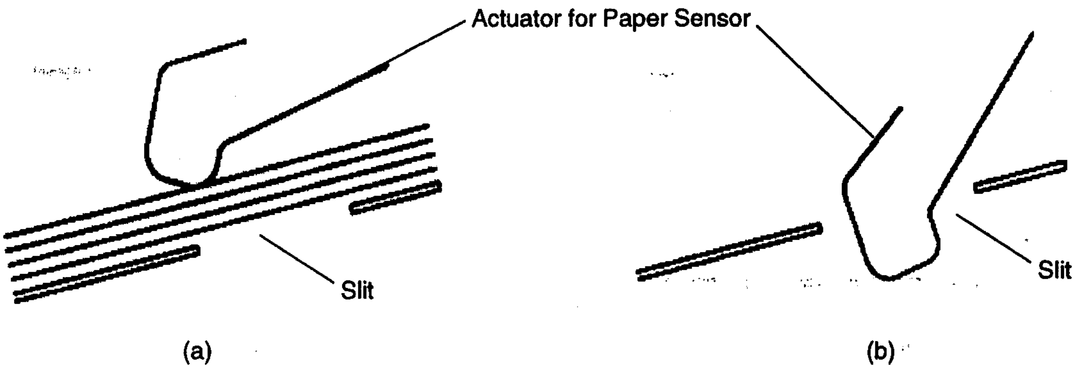
When the cassette is attached


Pick Up Roller
Plate Lift
Bracket Lift
Cassette

5.1 PAPER SENSOR

When the cassette is attached, the paper is detected by the paper sensor.
There is a slit on the cassette knock-up plate, so that the actuator enters the slit when no paper is supplied, then paper sensor is turned ON to detect that there is no paper.

Paper Sensor

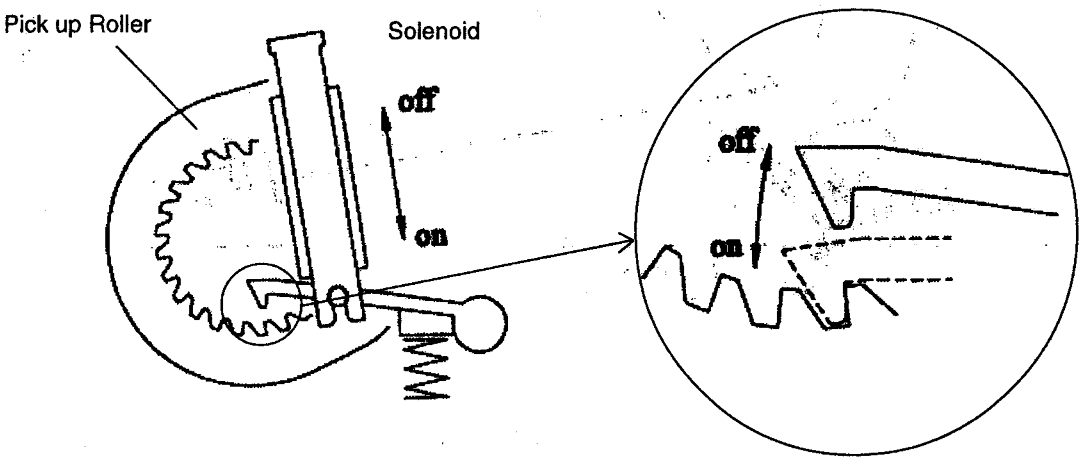


(a) When the paper is supplied.
(b) When no paper is supplied.

5.2 PICK UP ROLLER

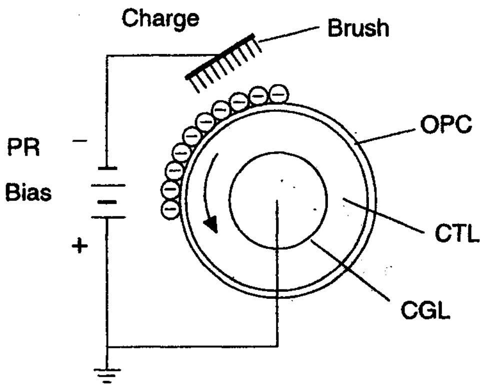
3) When feeding, the pick-up clutch is driven to skip the pick-up roller. The roller provided with CAM does not drive because of the clutch. When the voltage of 24V is added to the solenoid, the force is generated to pull up the actuator solenoid. Then the actuator clutch is moved from the pick-up roller.
At that time the pick-up roller returns to the home position after picking up the paper. When manual feeding, the paper presses the manual feeding sensor and the register roller holds the paper.
While printing the paper is carried by the register roller.

Pick-up clutch operation



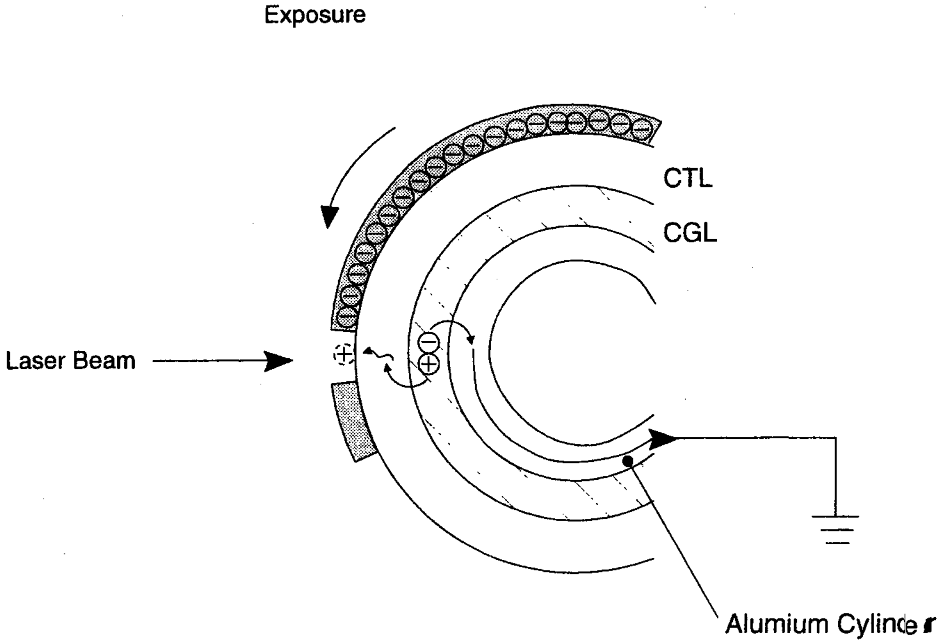
5.3 CHARGING

Charging is the stage that keeps the surface of the sensitive drum a fixed electric potential. The sensitive drum is the Organic Photo Cylinder (OPC), which is an aluminum cylinder whose surface is covered with the Charge Transfer Layer and (CTL)Charge Generation Layer(CGL).
When the high voltage is added and the minus charge is supplied to the charge brush while charging, the whole surface of the drum is minus-charged.



5.4 EXPOSING

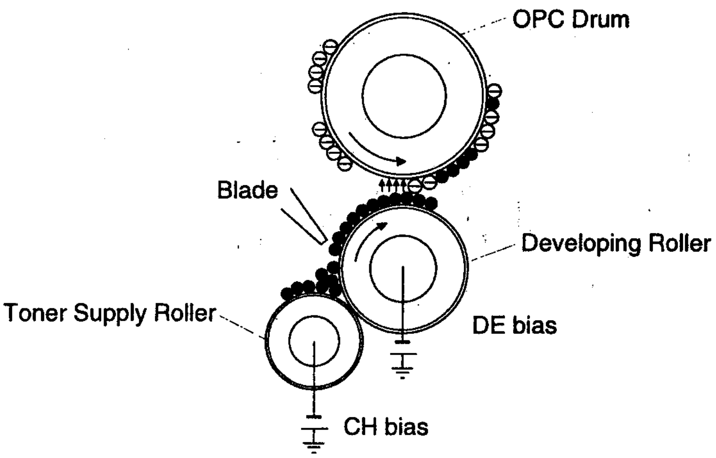
When the drum which is (CGL)charged with the fixed electric charge is irradiated by the laser beam, the plus charge is generated at the Charge Generation Layer. Passing through the Charge Transfer Layer (CTL) which conducts the plus charge, the minus charged drum surface is neutralized to be skipped. Consequently the charge of the part which is not exposed remains as it is, and the electric potential of the scanned part changes.
At that time an invisible image is created on the drum.



5.5 DEVELOPING

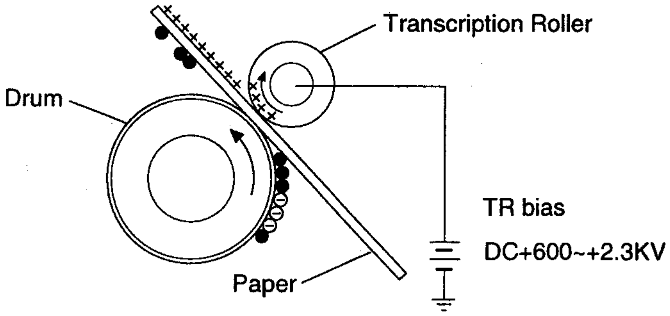
The developing is the stage that the sensitive drum with an invisible image is changed to visible by the toner.
The developer consists of developing roller, toner supply roller and the blade. The bias voltage is added to the developing roller and toner supply roller, then these 2 rollers are minus-charged by the friction.
Consequently the toner is transferred to the surface of the exposed sensitive drum.

Developing roller


OPC Drum
Blade
Developing Roller
Toner Supply Roller
DE bias
CH bias

5.6 TRANSCRIPTION

The transcription is the stage that the created image on the sensitive drum is transferred to the paper. When the transcription roller is plus-charged with the image, the minus-charged toner particles are gathered on the surface of the drum and transferred to the paper.


Transcription Roller
Drum
TR bias
DC+600~+2.3KV
Paper

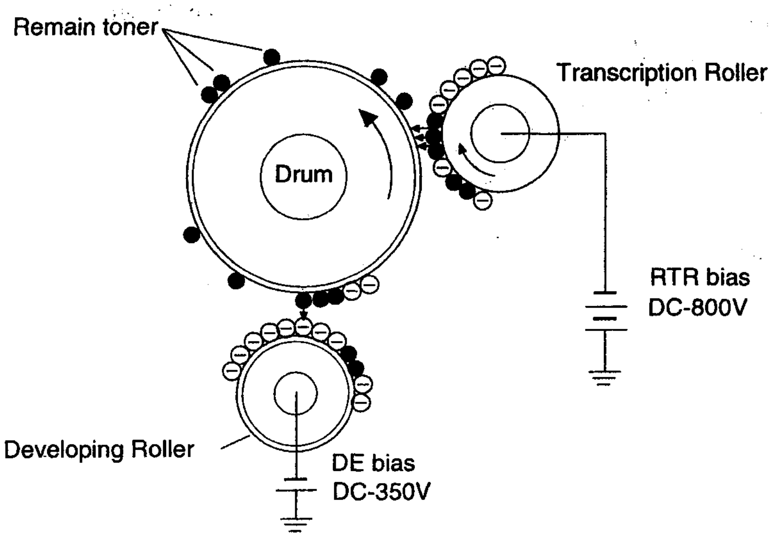
This printer employs the transcription roller method instead of the corona transfer method, and the followings are the merits.

1. The voltage is rather low comparing with the corona method.
2. Little ozone is generated.
3. The paper is supported by the sensitive drum and the transcription roller.

5.7 CLEANING

The toner attached to the surface of the sensitive drum is transferred to the paper at the transcription stage, but a part of the toner remains. The cleaning is the stage that cleans the remain toner after the transcription stage. The remain toner on the drum and the toner which was attached to the place where the laser beam didn't scan are gathered to the developing roller to be used again. When no paper is supplied, the transcription roller is minus charged to eliminate the minus-charged toner.

Cleaning



5.8 FIXING

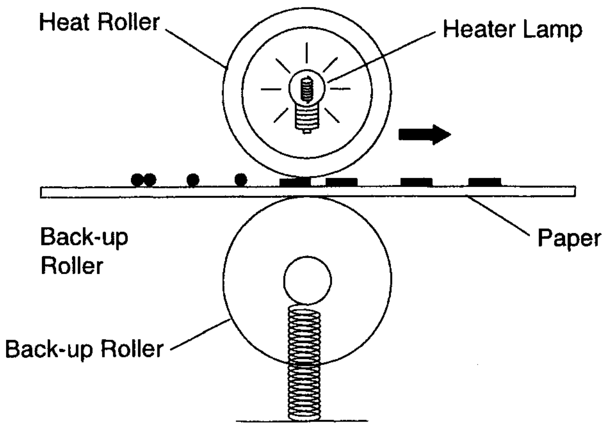
On the process of the transcription, the transferred toner is weakly attached on the paper by the static electricity. Fixing means the process to fix the toner on the paper permanently. The fixing part melts the toner at the high temperature using the heater lamp.

The toner is fixed on the paper by the heat and pressure through the fixing part with the image.

The surface of the heater roller is resined by Teflon and lubricated to prevent from attaching the toners.

The back-up roller is made of silicon, and its spring compresses the melted toner.

Fixing



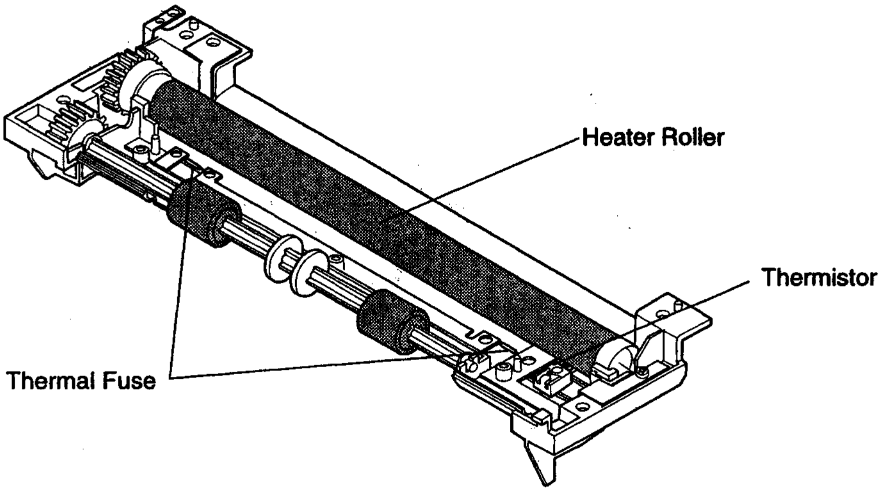
The fixing part becomes high temperature, so the thermistor and the thermal fuse are provided.

1)Thermistor

The thermistor touches the heater roller and check the temperature to feed back to the control circuit. The surface temperature should be kept 150 C°while printing.

2)Thermal Fuse

The thermal fuse takes the similar role with the thermistor. The thermal fuse is located 1.5 mm away from the heater roller and turns off the power when the temperature around the thermal fuse becomes over 150°C.



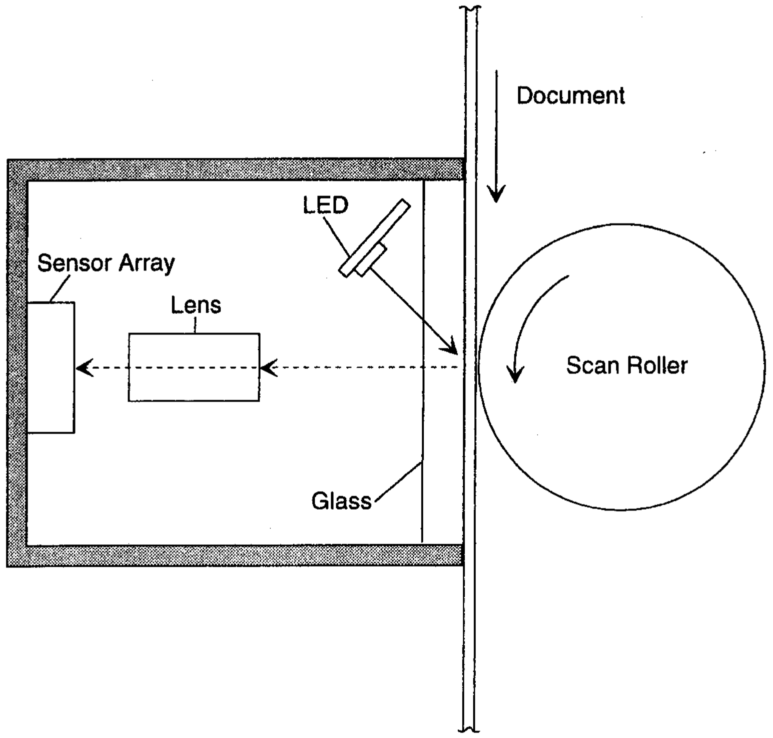
5.9 IMAGE READING

The Image Reading Part feeds and ejects the document when copying or scanning.
The image reading part consists of the followings.

5.9.1 Automatic Document Feeder
The automatic document feeder consists of various kinds of rollers, ADF rubbers, springs, etc. It divides the documents and transfers to the reading part, then stacks the documents on the document ejector (manual feeder) when finished reading.
This automatic document feeder is affordable until 15 documents at once. When the user put a document on the document feeder and the top of the document is touched, the document detect sensor is turned ON and the motor is driven.

The driven motor feeds the document and transfers it a little. When the printing part is ready for reading the document, the motor is driven again by the operation of the user to move the roller at a fixed speed. The documents are fed one by one separated by the ADF rubbers. The spring coil adds the pressure to the document so that the ADF rubber can separate the documents properly. ADF spring helps the document endure the pressure of ADF rubber to be fed smoothly. The document is ejected just like the manual feeding.

5.9.2 CIS (Contact Image Scanner)
CIS consists of LED, lens and sensor array. When the light emitted from LED is reflected on the document, the light reaches the sensor through the lens, then the sensor array detects the document.



CIRCUIT OPERATIONS

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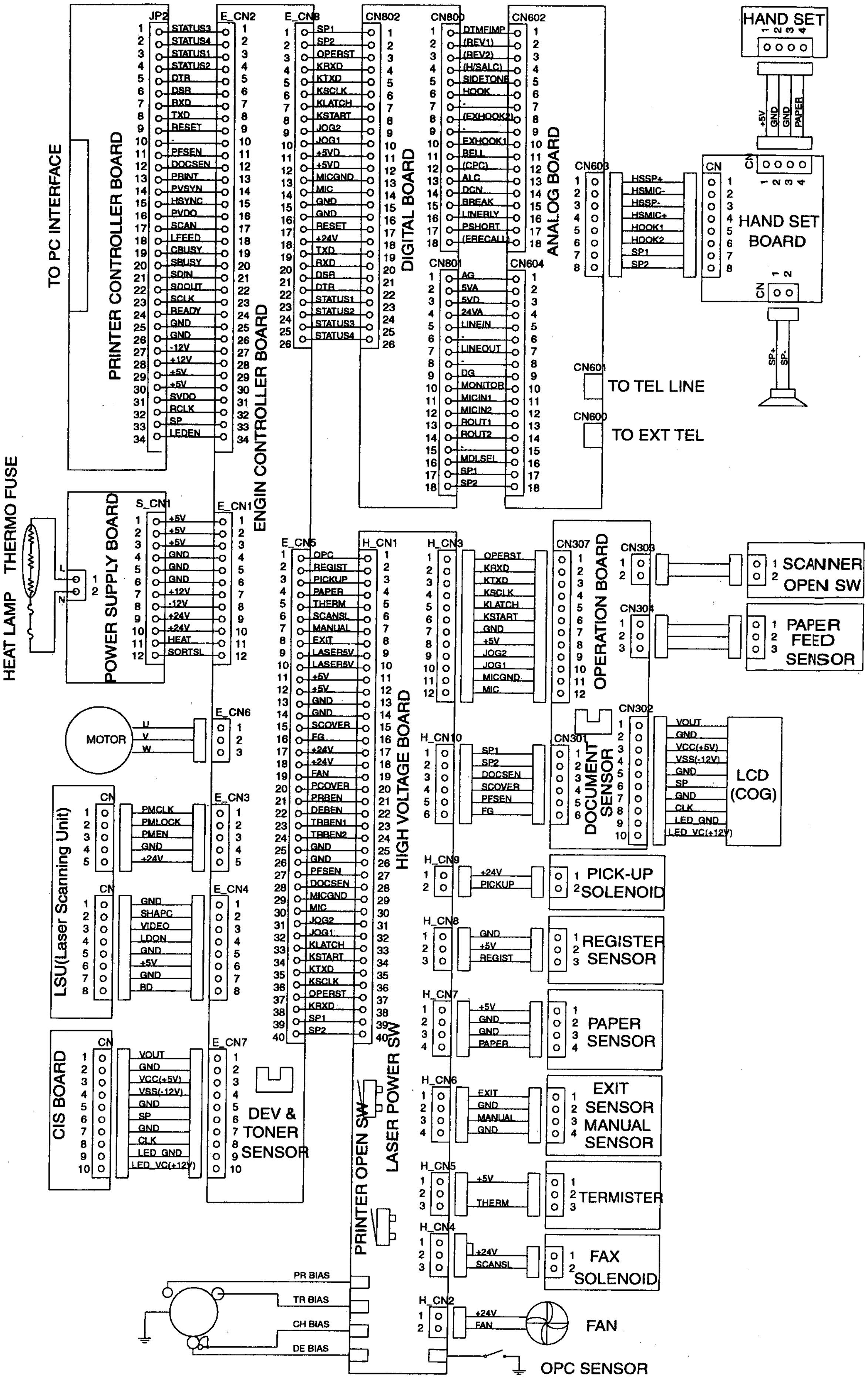
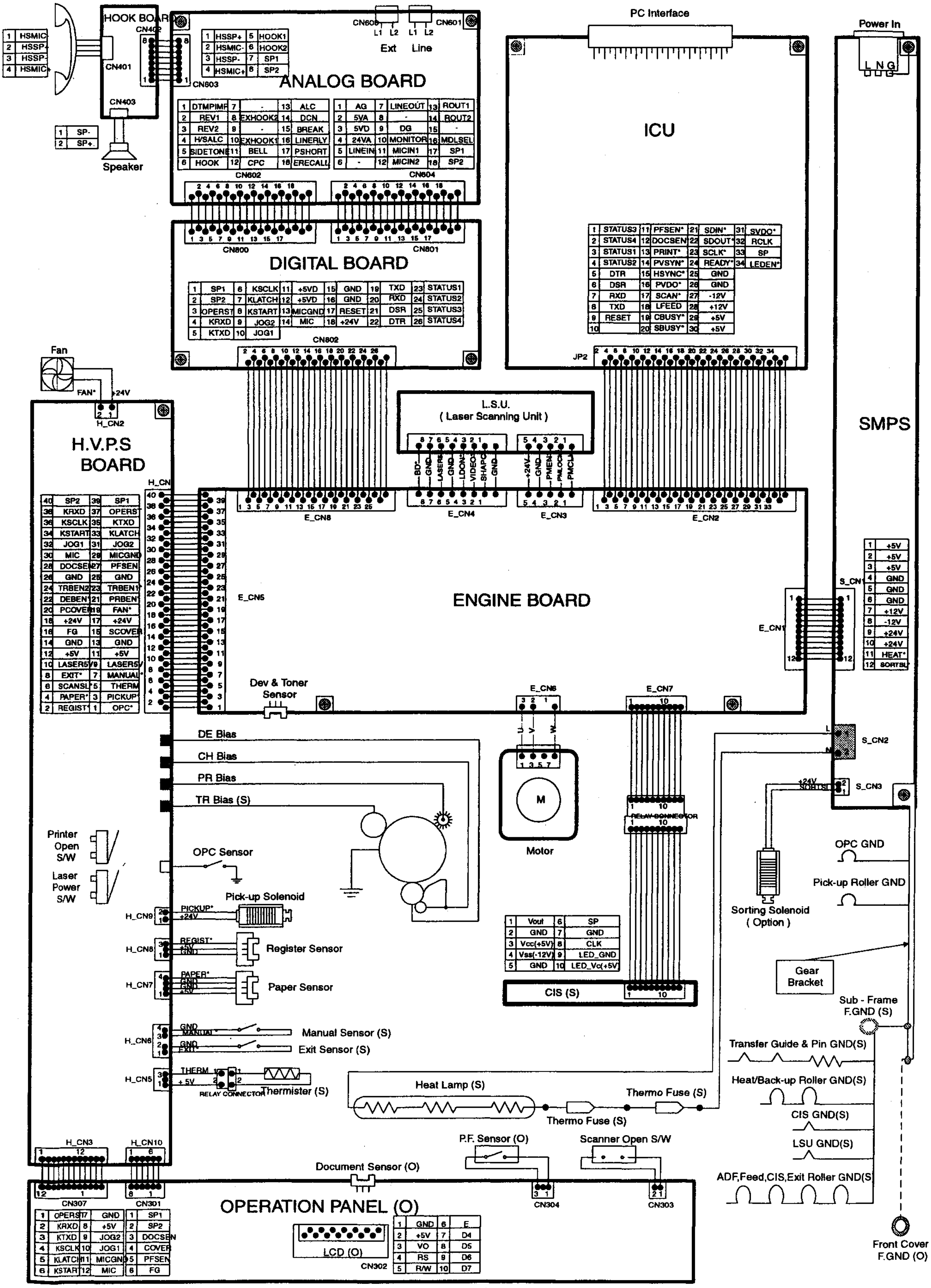
1. CONNECTION DIAGRAM

1.1 CONNECTION DIAGRAM (1)


TO PC INTERFACE
PRINTER CONTROLLER BOARD
JP2
E_CN2
ENGIN CONTROLLER BOARD
E_CN8
CN802
DIGITAL BOARD
CN800
CN602
ANALOG BOARD
CN801
CN604
STATUS3
STATUS4
STATUS1
STATUS2
DTR
DSR
RXD
TXD
RESET
PFSEN
DOCSEN
PRINT
PVSYN
HSYNC
PVDO
SCAN
LFEED
CBUSY
SBUSY
SDIN
SDOUT
SCLK
READY
GND
-12V
+12V
+5V
SVDO
BCLK
SP
LEDEN
SP1
SP2
OPERST
KRXD
KTXD
KSCLK
KLATCH
KSTART
JOG2
JOG1
+5VD
MICGND
MIC
+24V
DTMFIMP
(REV1)
(REV2)
(H/SALC)
SIDETONE
HOOK
(EXHOOK2)
EXHOOK1
BELL
(CPC)
ALC
DCN
BREAK
LINERLY
PSHORT
(ERECALL)
AG
5VA
5VD
24VA
LINEIN
LINEOUT
DG
MONITOR
MICIN1
MICIN2
ROUT1
ROUT2
MDLSEL
HAND SET
+5V
GND
PAPER
CN603
HSSP+
HSMIC-
HSSP-
HSMIC+
HOOK1
HOOK2
CN
HAND SET BOARD
SP+
SP-
CN601
TO TEL LINE
CN600
TO EXT TEL
THERMO FUSE
HEAT LAMP
L
N
POWER SUPPLY BOARD
S_CN1
E_CN1
+12V
+24V
HEAT
SORTSL
MOTOR
U
V
W
E_CN6
LSU(Laser Scanning Unit)
E_CN3
PMCLK
PMLOCK
PMEN
E_CN4
SHAPC
VIDEO
LDON
BD
CIS BOARD
E_CN7
VOUT
VCC(+5V)
VSS(-12V)
CLK
LED GND
LED VC(+12V)
DEV &
TONER
SENSOR
E_CN5
H_CN1
HIGH VOLTAGE BOARD
OPC
REGIST
PICKUP
THERM
SCANSL
MANUAL
EXIT
LASER5V
SCOVER
FG
FAN
PCOVER
PRBEN
DEBEN
TRBEN1
TRBEN2
H_CN3
CN307
OPERATION BOARD
CN303
SCANNER
OPEN SW
CN304
PAPER
FEED
SENSOR
CN302
CN301
DOCUMENT
SENSOR
LCD
(COG)
H_CN10
H_CN9
PICK-UP
SOLENOID
H_CN8
REGISTER
SENSOR
H_CN7
PAPER
SENSOR
H_CN6
EXIT
SENSOR
MANUAL
SENSOR
H_CN5
TERMISTER
H_CN4
FAX
SOLENOID
H_CN2
FAN
LASER POWER SW
PRINTER OPEN SW
PR BIAS
TR BIAS
CH BIAS
DE BIAS
OPC SENSOR

1.2 CONNECTION DIAGRAM (2)


HOOK BOARD
CN401
CN402
CN403
Speaker
CN603
CN606
CN601
L1 L2 L1 L2
Ext Line
ANALOG BOARD
CN602
CN604
CN600
CN601
DIGITAL BOARD
CN802
PC Interface
ICU
JP2
Power In
L N G
SMPS
S_CN1
S_CN2
S_CN3
L
N
+24V
SORTSL
Fan
FAN*
+24V
H_CN2
H.V.P.S BOARD
H_CN
L.S.U.
(Laser Scanning Unit)
BD*
GND
LASER
GND
LDON
VIDEO
SHAPC
GND
+24V
GND
PMEN
PMLOCK
PMCLK
E_CN8
E_CN4
E_CN3
E_CN2
E_CN5
ENGINE BOARD
E_CN1
Dev & Toner Sensor
E_CN6
E_CN7
U
V
W
M
Motor
RELAY CONNECTOR
DE Bias
CH Bias
PR Bias
TR Bias (S)
Printer Open S/W
Laser Power S/W
OPC Sensor
Pick-up Solenoid
H_CN9
PICKUP*
+24V
H_CN8
REGIST*
+5V
GND
Register Sensor
H_CN7
PAPER*
GND
GND
+5V
Paper Sensor
H_CN6
GND
MANUAL*
GND
EXIT*
Manual Sensor (S)
Exit Sensor (S)
H_CN5
THERM
+ 5V
RELAY CONNECTOR
Thermister (S)
Heat Lamp (S)
Thermo Fuse (S)
Thermo Fuse (S)
CIS (S)
Sorting Solenoid (Option)
OPC GND
Pick-up Roller GND
Gear Bracket
Sub - Frame F.GND (S)
Transfer Guide & Pin GND(S)
Heat/Back-up Roller GND(S)
CIS GND(S)
LSU GND(S)
ADF,Feed,CIS,Exit Roller GND(S)
Front Cover F.GND (O)
P.F. Sensor (O)
Scanner Open S/W
Document Sensor (O)
H_CN3
H_CN10
CN307
CN301
CN304
CN303
OPERATION PANEL (O)
LCD (O)
CN302

1	HSMIC-
2	HSSP+
3	HSSP-
4	HSMIC+

1	SP-
2	SP+

CN603

1	HSSP+	5	HOOK1
2	HSMIC-	6	HOOK2
3	HSSP-	7	SP1
4	HSMIC+	8	SP2

CN602

1	DTMPIMF	7	-	13	ALC
2	REV1	8	EXHOOK2	14	DCN
3	REV2	9	-	15	BREAK
4	H/SALC	10	EXHOOK1	16	LINERLY
5	SIDETONE	11	BELL	17	PSHORT
6	HOOK	12	CPC	18	ERECALL

CN604

1	AG	7	LINEOUT	13	ROUT1
2	5VA	8	-	14	ROUT2
3	5VD	9	DG	15	-
4	24VA	10	MONITOR	16	MDLSEL
5	LINEIN	11	MICIN1	17	SP1
6	-	12	MICIN2	18	SP2

CN802

1	SP1	6	KSCLK	11	+5VD	15	GND	19	TXD	23	STATUS1
2	SP2	7	KLATCH	12	+5VD	16	GND	20	RXD	24	STATUS2
3	OPERST	8	KSTART	13	MICGND	17	RESET	21	DSR	25	STATUS3
4	KRXD	9	JOG2	14	MIC	18	+24V	22	DTR	26	STATUS4
5	KTXD	10	JOG1								

JP2

1	STATUS3	11	PFSEN*	21	SDIN*	31	SVDO*
2	STATUS4	12	DOCSEN*	22	SDOUT*	32	RCLK
3	STATUS1	13	PRINT*	23	SCLK*	33	SP
4	STATUS2	14	PVSYN*	24	READY*	34	LEDEN*
5	DTR	15	HSYNC*	25	GND		
6	DSR	16	PVDO*	26	GND		
7	RXD	17	SCAN*	27	-12V		
8	TXD	18	LFEED	28	+12V		
9	RESET	19	CBUSY*	29	+5V		
10		20	SBUSY*	30	+5V		

H_CN

40	SP2	39	SP1
38	KRXD	37	OPERST
36	KSCLK	35	KTXD
34	KSTART	33	KLATCH
32	JOG1	31	JOG2
30	MIC	29	MICGND
28	DOCSEN	27	PFSEN
26	GND	25	GND
24	TRBEN2	23	TRBEN1*
22	DEBEN*	21	PRBEN*
20	PCOVER	19	FAN*
18	+24V	17	+24V
16	FG	15	SCOVER
14	GND	13	GND
12	+5V	11	+5V
10	LASER5V	9	LASER5V
8	EXIT*	7	MANUAL*
6	SCANSL*	5	THERM
4	PAPER*	3	PICKUP*
2	REGIST*	1	OPC*

S_CN1

1	+5V
2	+5V
3	+5V
4	GND
5	GND
6	GND
7	+12V
8	-12V
9	+24V
10	+24V
11	HEAT*
12	SORTSL*

1	Vout	6	SP
2	GND	7	GND
3	Vcc(+5V)	8	CLK
4	Vss(-12V)	9	LED_GND
5	GND	10	LED_Vc(+5V)

CN307

1	OPERST	7	GND
2	KRXD	8	+5V
3	KTXD	9	JOG2
4	KSCLK	10	JOG1
5	KLATCH	11	MICGND
6	KSTART	12	MIC

CN301

1	SP1
2	SP2
3	DOCSEN
4	COVER
5	PFSEN
6	FG

CN302

1	GND	6	E
2	+5V	7	D4
3	VO	8	D5
4	RS	9	D6
5	R/W	10	D7

*(S):Sub Frame Parts *(O):Operating parts *▨ :High Voltage or AC Voltage *⊛ :Frame Ground Point

2. GENERAL BLOCK DIAGRAM

The control section will be explained as shown in the block diagram.

1) Digital Board

Digital Board controls mainly TEL basic function, FAX communication function, Operation panel and LCD.

① ASIC(IC807)
Composed mainly of an address decoder and modem control section.
Controls the FAX operations.
Controls the operation panel I/F.
CPU and Real time clock
Provides the reset pulse to each of the major ICs.

② ROM(IC808)
Contains all of the program instructions for FAX unit operations.

③ Static RAM(IC805)
This Memory is used mainly for the parameter working storage area and the user setting parameters.

④ Dynamic RAM(IC804)
This Memory is used mainly for the CPU working and receiving memory.

⑤ MODEM(IC802)
Executes modulation and demodulation for FAX communication.

⑥ Analog ASIC(IC811)
Composed of crosspoint switch ,electric volume and VOX detect circuit.

2) Analog Board

The analog section works as an iterface between the telephone line. Composed of an ITS circuit and NCU circuit.

3) Printer Controller Board

Printer Controller Board controls mainly printing function, scanning function and PC communication.

① RISC CPU(U1)
Composed mainly of an address decoder and printing control secton.
Controls the image processing.
LSU I/F
Serial I/F for Digital board.
Serial I/F for Engine contoroller board.
Pallarel I/F for the PC.

② G/A(U10)
Address decoding.
Reset control.
Generates scanner control signal.
Generates Engine Video Clock.

③ AK8414(U9)
Execute image processing.

④ Dynamic RAM(U2,U5,)
This Memory is used mainly for the CPU working area and imaging data buffer.

⑤ Flash ROM(U4,U7)
Contains all of the program instructions for PRINTER unit operations.

4) Engine Controller Board
Engine board controls the unit or parts related with printing :motor, sensors, heater, LSU and fan, etc.

① MPU(U5)
8bits one chip Microcomputer
Controls printing function.
Contains CPU, 60KB ONE TIME PROM, general I/O and A/D convertor.

② Motor Drive Controller(U4)
Controls the moter driving for the three-phase stepping motor
Drives the motor by fixed current of the PWM(Pulse Width Modutration) control.

③ Motor Driver(U8)
Drives the motor.
Composed four transistors.

5) Read Section
CIS image sensor to read transmitting documents.

6) LSU(Laser Scanning Unit)
Forms the images on the OPC drum by rotating polygon motor and reflecting the laser beam against polygon mirror.

7) Fixing Unit
Composed leat lamp, thermistor and two thermal fuses.

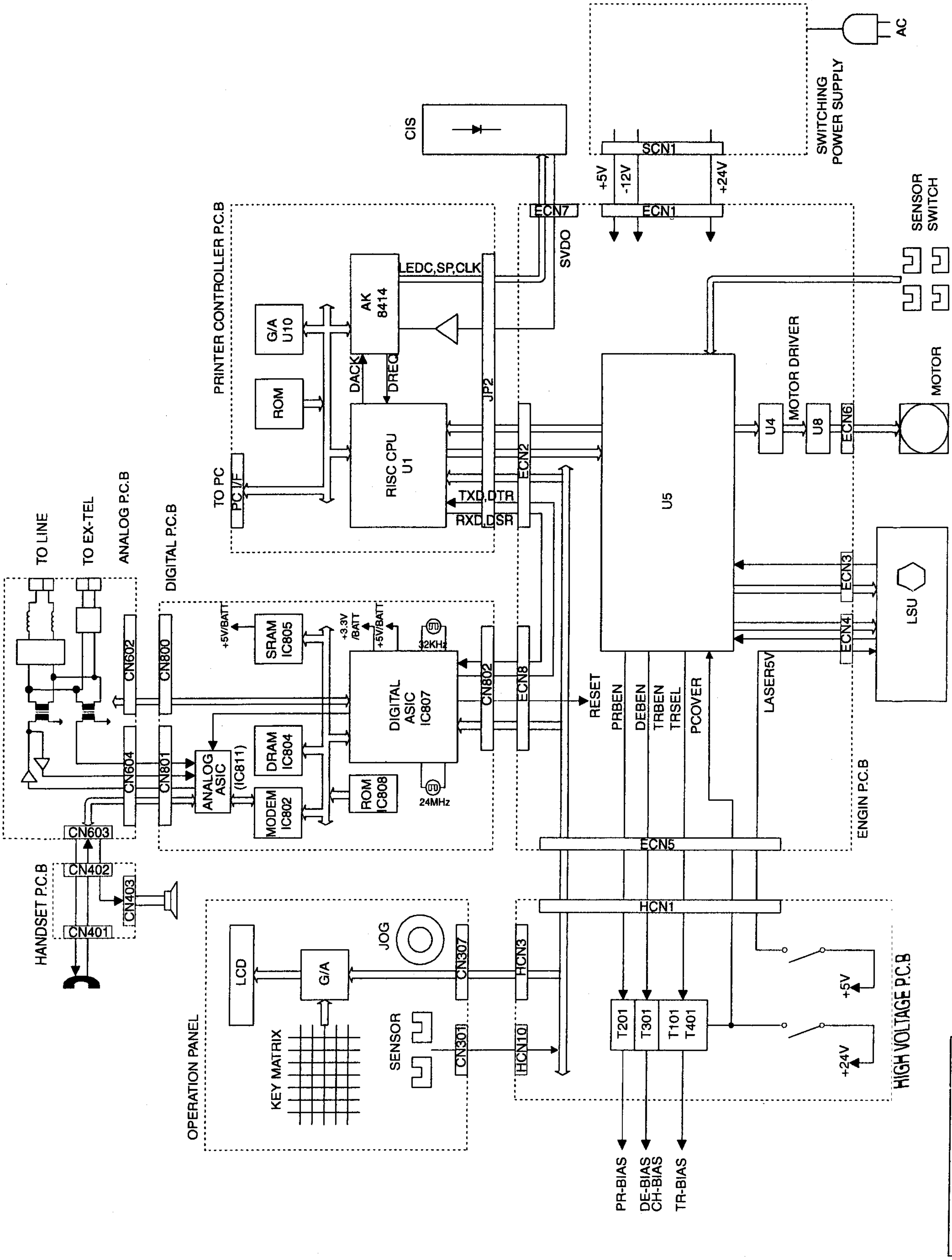
8) Sensor Section
Composed of a cover open sensor, document sensor, paper feed sensor, a scanner cover open switch, laser power switch, exit switch, manual switch, set paper sensor, paper regist sensor, OPC drum switch, Dev & toner sensor.

9) SMPS(Switching Mode Power Supply) Board
Supplies +5V, +24V and -12V to the unit and controls heater.

10) HVPS(High Voltage Power Supply) Board
Supplies bias need for the printing operation : bias of the OPC, developing and transcription.

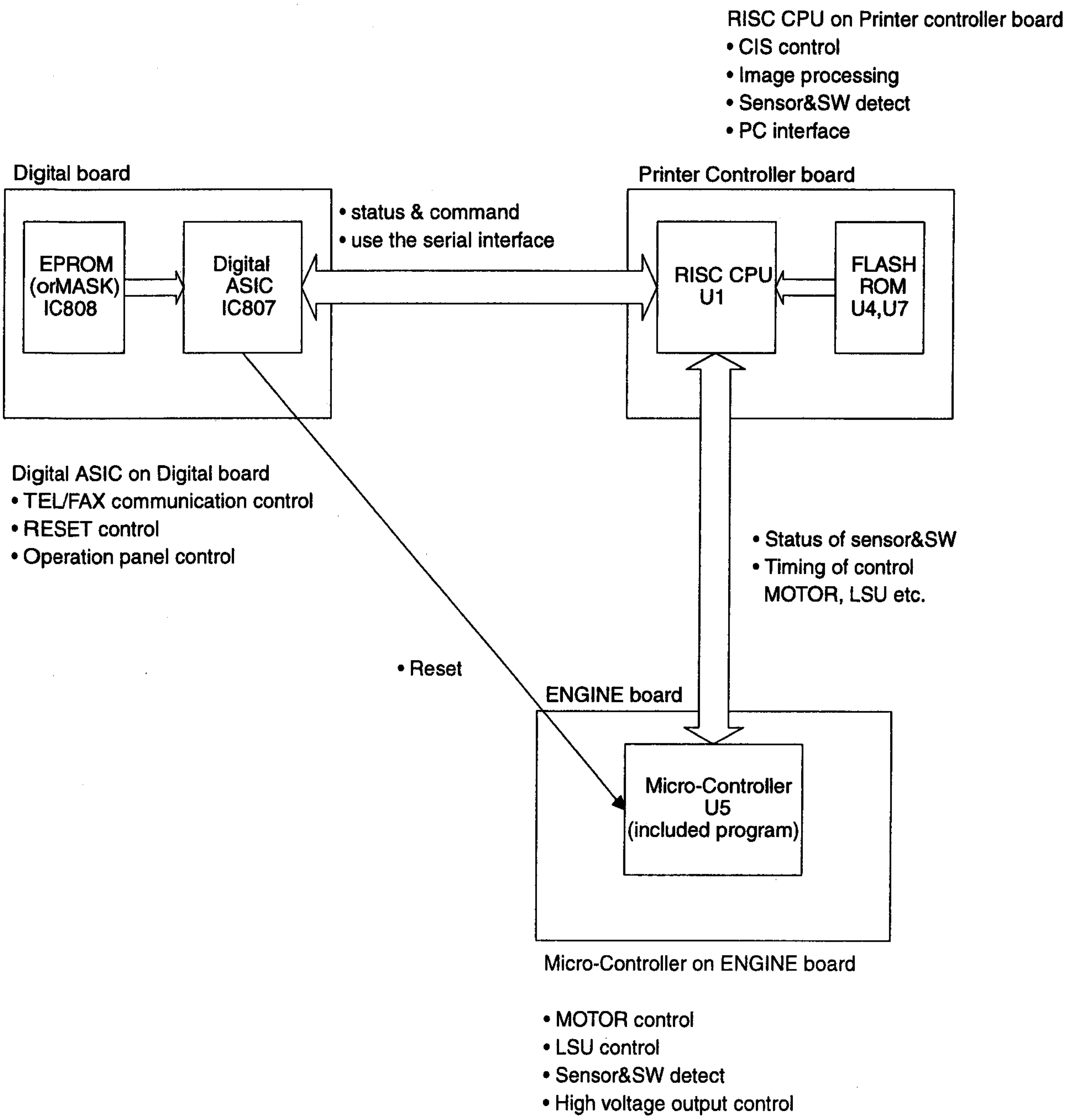
11) Operation Panel Board
Consists of a LCD(Liquid Crystal Display), KEYs and LEDs. They are controlled by the Gate Array(IC301) and ASIC(IC807 :on the Digital Board).

General Block Diagram


AC
SWITCHING POWER SUPPLY
SCN1
+5V
-12V
+24V
ECN1
ECN7
CIS
SVDO
SENSOR SWITCH
PRINTER CONTROLLER P.C.B
LEDC,SP,CLK
AK 8414
G/A U10
ROM
DACK
DREQ
JP2
RISC CPU U1
TO PC
PC I/F
TXD,DTR
RXD,DSR
ECN2
U5
MOTOR DRIVER
U4
U8
ECN6
MOTOR
ECN3
ECN4
LSU
TO LINE
TO EX-TEL
ANALOG P.C.B
DIGITAL P.C.B
CN602
CN800
CN604
CN801
CN603
+5V/BATT
SRAM IC805
+3.3V /BATT
+5V/BATT
32KHz
DIGITAL ASIC IC807
CN802
ECN8
RESET
ANALOG ASIC (IC811)
DRAM IC804
MODEM IC802
ROM IC808
24MHz
PRBEN
DEBEN
TRBEN
TRSEL
PCOVER
LASER5V
ENGIN P.C.B
ECN5
HANDSET P.C.B
CN402
CN403
CN401
HCN1
OPERATION PANEL
LCD
G/A
JOG
CN307
HCN3
KEY MATRIX
SENSOR
CN301
HCN10
T201
T301
T101
T401
+5V
+24V
HIGH VOLTAGE P.C.B
PR-BIAS
DE-BIAS
CH-BIAS
TR-BIAS

2.1 RELATION OF 3 CPUS & ROMS

There are 3 CPUs and 3 ROMs in KX-FLM600.
If these 3 ROMs'version are unmatched, the unit does not work correctly.
The function of each CPU and relation of each other CPUs are shown below.


Digital board
EPROM (orMASK) IC808
Digital ASIC IC807
• status & command
• use the serial interface
Printer Controller board
RISC CPU U1
FLASH ROM U4,U7
• Status of sensor&SW
• Timing of control MOTOR, LSU etc.
• Reset
ENGINE board
Micro-Controller U5 (included program)

RISC CPU on Printer controller board
- CIS control
- Image processing
- Sensor&SW detect
- PC interface

Digital ASIC on Digital board
- TEL/FAX communication control
- RESET control
- Operation panel control

Micro-Controller on ENGINE board

- MOTOR control
- LSU control
- Sensor&SW detect
- High voltage output control

How to check ROM version

Enter service mode. Press MENU key, then input #9000 *551(ROM CHECK MODE).
As you press the START key, you can know each ROM version.

DIGITAL ROM version
↓
ENGINE ROM version
↓
PRINTER CONTROLLER ROM version

2.2 IMAGE DATA FLOW

Refer to the block diagram on the following page.

1. COPY
   1) White plate information is read by CIS (to be used as the reference white level) via route *1*, and the result is input to U9.
   2) In U9, via route *2*, it is stored in RAM as shading data.
   3) The draft's information that is read by CIS is input to U9 via route *1*. After adjusting it to a suitable level for A/D conversion via route *4*, the draft's information is converted to A/D (6 bits), and it is input to the Image Processing Section via route *5*. The other side, the shading data which flows from RAM via route *3*, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1".
   4) The white/black data is input to the S/P converter via route *6*. The white/black data converted to parellel data in the S/P converter is input to DRAMs(U2,U5) via routes *7* and *8* by DMA.
   5) The stored data in DRAMs(U2,U5) is input to LSU via routes *9,10,11* and *12* by DMA.

2. TRANSMISSION
   1) Same processing as COPY items 1)-4).
   2) The data stored in DRAMs(U2,U5) is output from them via routes *9,10* and *13*, and is compressed in MMR and then restored to DRAMs(U2,U5) via routes *14,19* and *8*.
   3) U1(CPU) retrieves the data stored in MMR buffer and forwards to DIGITAL BOARD via routes *9,10,21* and *22*.
   4) The CPU(IC807) inputs the data to the modem along routes *23* and *24*, where it is converted to serial Analog data and forwarded over the telephone lines via the NCU section.

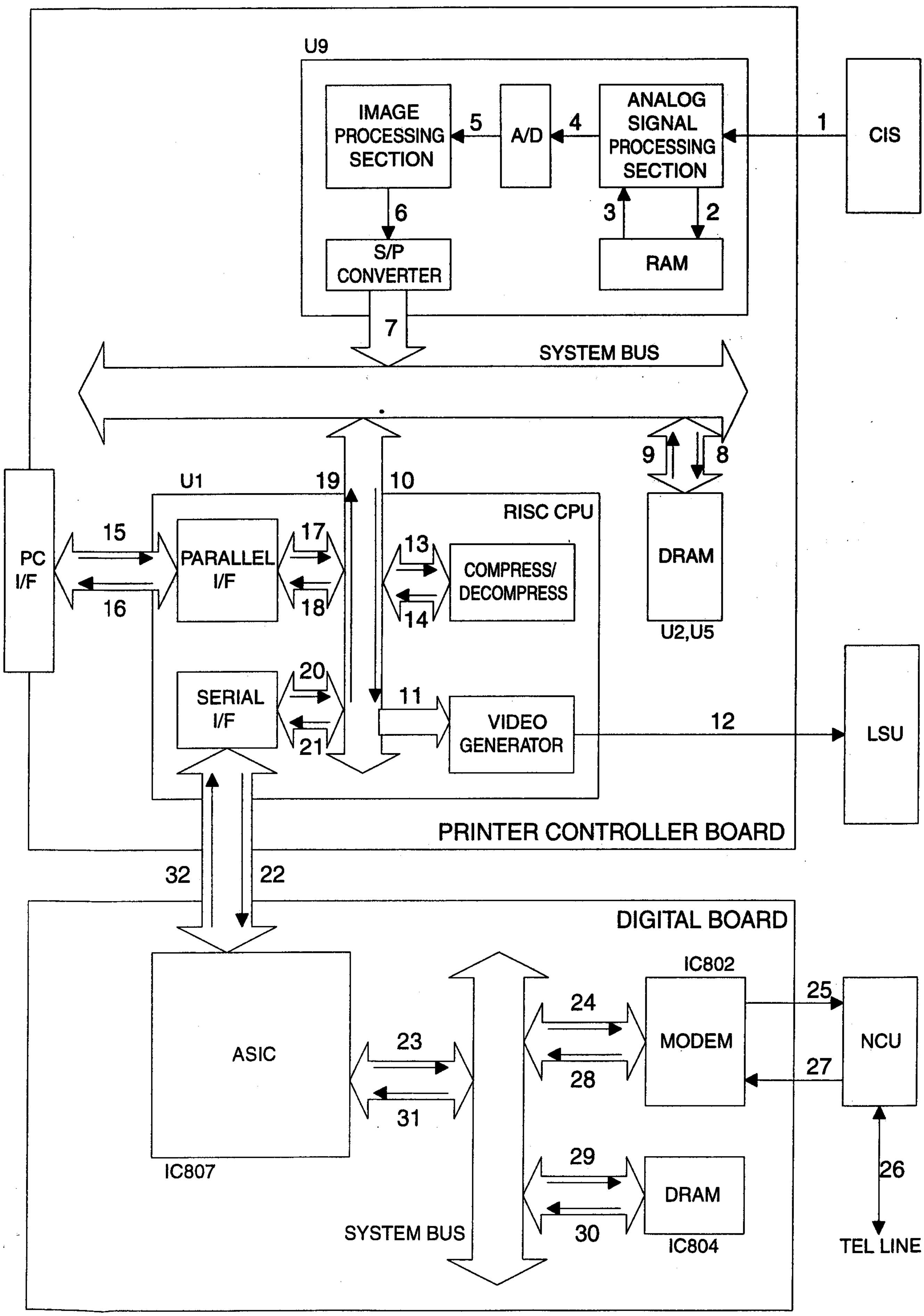
3. RECEPTION
   1) The serial analog image data is retrieved over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC807) stores the data in the communication buffer DRAM(IC804) along routes *28* and *29*.
   2) The CPU(IC807) forwards the data in DRAM(IC804) to PRINTER CONTROLLER BOARD via routes *30,31* and *32*.
   3) The CPU(U1) saved data to DRAMs(U2,U5) via routes *20,19* and *8*.
   4) The data stored in DRAMs(U2,U5) is output from them via routes *9,10* and *13*. It is decompressed in U1 and restored to DRAMs(U2,U5) via routes *14,19* and *8*.
   5) U1 retrieved the data stored in BMP buffer and forwards to LSU to make a hardcopy via routes *9,10,11* and *12*.

4. PC PRINT
   1) U1(CPU) gets the data compressed in LZW format from PC via route *15* and stores it to DRAMs(U2,U5) via routes *17,19* and *8*.
   2) U1 retrieves the data stored in LZW buffer and decompresses it via routes *9,10,13,14* and *11*, Finally, it is forwarded to LSU via route *12*.

5. PC TRANSMISSION
   1) U1(CPU) gets the data compressed in MH format from PC via route *15* and stores it to DRAMs(U2,U5) via routes *17,19* and *8*.
   2) U1 retrieves the data stored in PC-FAX buffer and forwards it to DIGITAL BOARD via routes *9,10,21* and *22*.
   3) The CPU(IC807) inputs the data to the modem along routes *23* and *24*, where it is converted to serial Analog data and forwarded over the telephone lines via the NCU section.

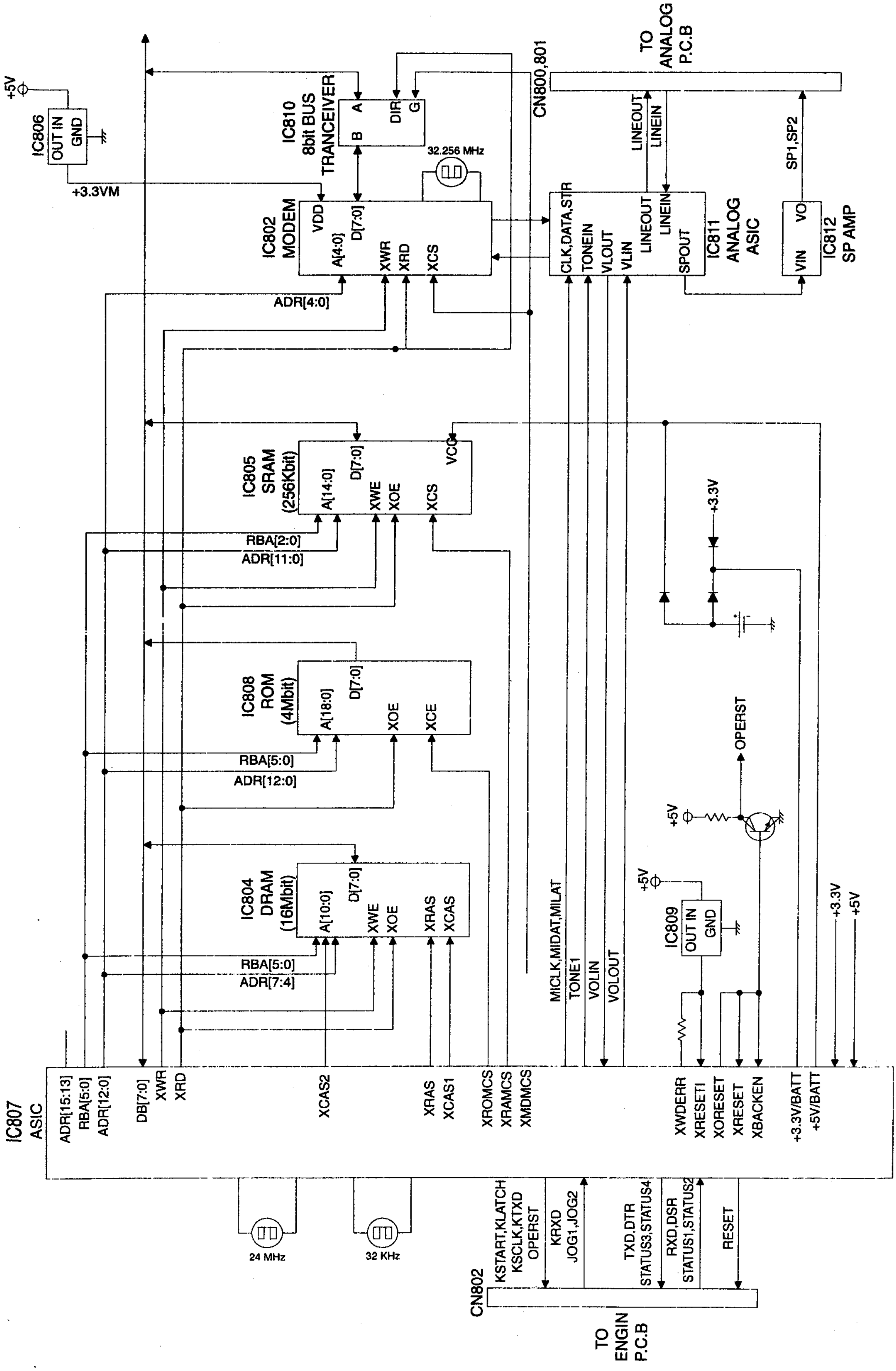
6. PC RECEPTION
   1) The serial analog image data is retrieved over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC807) stores the data in the communication buffer DRAM(IC804) along routes *28* and *29*.
   2) The CPU(IC807) compresses the data in DRAM(IC804) in MH format and forwards the data to PRINTER CONTROLLER BOARD via routes *30,31* and *32*.
   3) The CPU(U1) saved data to DRAMs(U2,U5) via routes *20,19* and *8*.
   4) U1 retrieves the data stored in PC-FAX buffer and forwards it to PC via routes *9,10,18* and *16*.

Data Flow Block Diagram


U9
IMAGE PROCESSING SECTION
5
A/D
4
ANALOG SIGNAL PROCESSING SECTION
1
CIS
6
3
2
S/P CONVERTER
RAM
7
SYSTEM BUS
9
8
U1
19
10
RISC CPU
PC I/F
15
PARALLEL I/F
17
13
COMPRESS/ DECOMPRESS
DRAM
16
18
14
U2,U5
SERIAL I/F
20
21
11
VIDEO GENERATOR
12
LSU
PRINTER CONTROLLER BOARD
32
22
DIGITAL BOARD
IC802
25
24
MODEM
NCU
ASIC
23
28
27
31
IC807
29
DRAM
26
SYSTEM BUS
30
IC804
TEL LINE

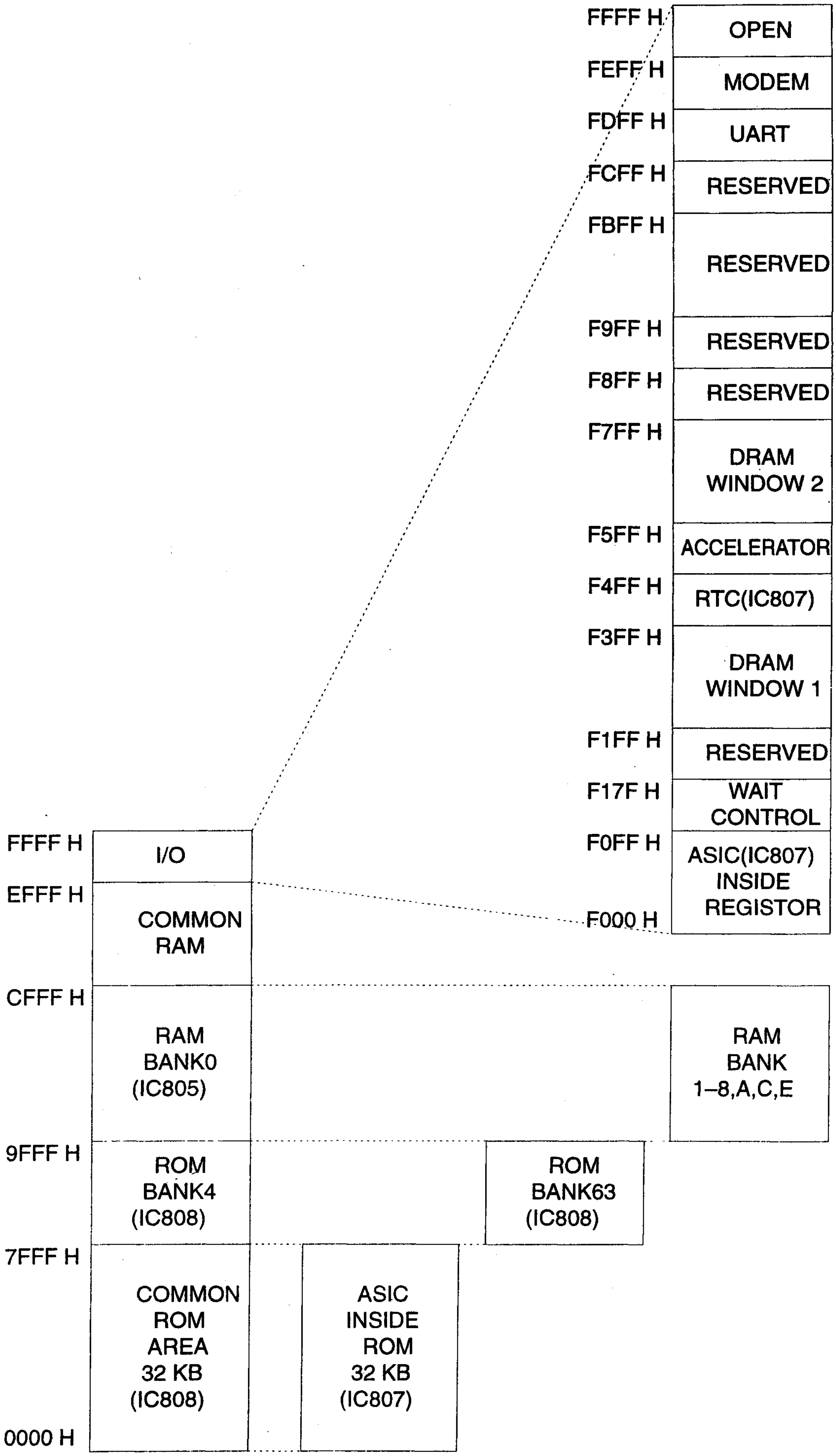
3. FAX CONTROL SECTION

Block Diagram



IC806
OUT IN
GND
+5V
+3.3VM
IC810
8bit BUS
TRANCEIVER
A
B
DIR
G
CN800,801
TO
ANALOG
P.C.B
32.256 MHz
IC802
MODEM
VDD
D[7:0]
A[4:0]
XWR
XRD
XCS
ADR[4:0]
CLK,DATA,STR
TONEIN
VLOUT
VLIN
LINEOUT
LINEIN
SPOUT
IC811
ANALOG
ASIC
SP1,SP2
VO
VIN
IC812
SP AMP
IC805
SRAM
(256Kbit)
A[14:0]
D[7:0]
XWE
XOE
XCS
VCC
RBA[2:0]
ADR[11:0]
+3.3V
IC808
ROM
(4Mbit)
A[18:0]
D[7:0]
XOE
XCE
RBA[5:0]
ADR[12:0]
OPERST
+5V
IC804
DRAM
(16Mbit)
A[10:0]
D[7:0]
XWE
XOE
XRAS
XCAS
RBA[5:0]
ADR[7:4]
+5V
IC809
OUT IN
GND
MICLK,MIDAT,MILAT
TONE1
VOLIN
VOLOUT
+3.3V
+5V
IC807
ASIC
ADR[15:13]
RBA[5:0]
ADR[12:0]
DB[7:0]
XWR
XRD
XCAS2
XRAS
XCAS1
XROMCS
XRAMCS
XMDMCS
XWDERR
XRESETI
XORESET
XRESET
XBACKEN
+3.3V/BATT
+5V/BATT
24 MHz
32 KHz
CN802
KSTART,KLATCH
KSCLK,KTXD
OPERST
KRXD
JOG1,JOG2
TXD,DTR
STATUS3,STATUS4
RXD,DSR
STATUS1,STATUS2
RESET
TO
ENGIN
P.C.B

MEMORY MAP


FFFF H
OPEN
FEFF H
MODEM
FDFF H
UART
FCFF H
RESERVED
FBFF H
RESERVED
F9FF H
RESERVED
F8FF H
RESERVED
F7FF H
DRAM WINDOW 2
F5FF H
ACCELERATOR
F4FF H
RTC(IC807)
F3FF H
DRAM WINDOW 1
F1FF H
RESERVED
F17F H
WAIT CONTROL
F0FF H
ASIC(IC807) INSIDE REGISTOR
F000 H
FFFF H
I/O
EFFF H
COMMON RAM
CFFF H
RAM BANK0 (IC805)
RAM BANK 1–8,A,C,E
9FFF H
ROM BANK4 (IC808)
ROM BANK63 (IC808)
7FFF H
COMMON ROM AREA 32 KB (IC808)
ASIC INSIDE ROM 32 KB (IC807)
0000 H

• ASIC (IC807)

This custom IC is used for general FAX operations.

(1) CPU:	This model uses a Z80 equivalent CPU operating at 12MHz. Many of the peripheral functions are handled by custom designed LSIs. As a result,the CPU only needs to process the results.
(2) RTC:	Real time clock.
(3) DECODER:	Decodes the address.
(4) ROM/RAM I/F:	Controls the SELECT signal of ROM or RAM and bank switching.
(5) OPERATION PANEL I/F:	Serial interface with Operation Panel.
(6) I/O PORT:	I/O Port Interface.
(7) ANALOG UNIT:	Electronic volume for the handset and monitor. Sends beep tones,etc.
(8) ANALOG ASIC I/F:	

• ROM (IC808)

This 512KB ROM (EPROM or MASKROM) has 32KB of common area and bank area (BK4~BK63).
The capacity of each bank is 8KB.
The addresses of the common area are from 0000H to 7FFFH,and addresses 8000H to 9FFFH are for the bank area.

• STATIC RAM (IC805)

This 32KB RAM has 8KB of common area and bank area (BK0~BK8,A,C,E).
The capacity of each bank is 12KB.
The addresses of the common area are from D000H to EFFFH,and addresses A000H to CFFFH are for the bank area.

• DYNAMIC RAM (IC804)

This DRAM is used for CPU work and receiving memory.
The address is from F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

3.1 EXPLANATION OF PIN DISTRIBUTION (IC807)

3.7 Explanation of Pin Distribution (IC807)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
1	AIN1	A	3.3V	NOT USED
2	AIN2	A	3.3V	NOT USED
3	AIN3	A	3.3V	NOT USED
4	AMON	A	3.3V	NOT USED
5	VSSB		GND	POWER SOURCE(ANALOG GND)
6	VDDB		3.3V	POWER SOURCE(ANALOG +3.3V)
7	VDDB(3.3V/BATT)		3.3V/BATT	POWER SOURCE(+3.3V/LITHIUM BATTERY)
8	X32OUT	O	3.3V/BATT	RTC(32.768KHz) CONNECTION
9	X32IN	I	3.3V/BATT	RTC(32.768KHz) CONNECTION
10	VSS		GND	POWER SOURCE(GND)
11	XBACKEN	I	5V/BATT	BACKUP ENABLE
12	VDD(5V/BATT)		5V/BATT	POWER SOURCE(+5V/LITHIUM BATTERY)
13	XRAMCS	O	5V/BATT	RAM(IC805) CHIP SELECT
14	XRAMCS2	O	5V/BATT	NOT USED
15	FTG	O	5V	NOT USED
16	F1	O	5V	NOT USED
17	F2/OP50	O	5V	OUTPUT PORT(LINERLY)
18	FR/OP51	O	5V	OUTPUT PORT(BREAK)
19	VIDRST/IOP20	I	5V	INPUT PORT(BELL)
20	SPHCLK/IOP21	I	5V	INPUT PORT(EX-HOOK1)
21	DARKON/IOP22	I	5V	INPUT PORT(ALC)
22	ADSEL2/IOP23	I	5V	INPUT PORT(T/P)
23	CPC	I	5V	NOT USED(HIGH FIXED)
24	BELL	O	5V	NOT USED
25	VDD(5V)		5V	POWER SOURCE(+5V)
26	VSS		GND	POWER SOURCE(GND)
27	RVN	I	5V	NOT USED(LOW FIXED)
28	IRDATXD/IOP81	O	5V	OUTPUT PORT(MODEM RESET)
29	IRDARXD/IOP80	I	5V	INPUT PORT(DCN)
30	TXD/IOP30	O	5V	PRINTER & SCANNER DRIVER P.C.B INTERFACE
31	RXD/IOP31	I	5V	PRINTER & SCANNER DRIVER P.C.B INTERFACE
32	XRTS/IOP32	O	5V	NOT USED
33	XCTS/IOP33	I	5V	NOT USED(LOW FIXED)
34	XDSR/IOP34	I	5V	PRINTER & SCANNER DRIVER P.C.B INTERFACE
35	DCD/IOP35	O	5V	NOT USED
36	XDTR/IOP36	O	5V	PRINTER & SCANNER DRIVER P.C.B INTERFACE
37	RI/CLK/IOP37	I	5V	INPUT PORT(HOOK)
38	TONE1		5V	TONE OUTPUT
39	TONE2		5V	NOT USED
40	VOL1		5V	E-VOL REF VOLTAGE INPUT
41	VOL2		5V	E-VOL OUTPUT
42	VOL3		5V	E-VOL INPUT
43	MIDAT/IOP45	O	5V	ANALOG ASIC(IC811) CONTROL
44	MICLK/IOP46	O	5V	ANALOG ASIC(IC811) CONTROL
45	MILAT/IOP47	O	5V	ANALOG ASIC(IC811) CONTROL
46	XRESCS1/OP72	O	5V	OUTPUT PORT(DTMFIMP)
47	IOP90	O	5V	NOT USED
48	VSS		GND	POWER SOURCE(GND)
49	VDD(5V)		5V	POWER SOURCE(+5V)
50	XNMI	I	5V	HIGH FIXED
51	CBUSY2	O	5V	NOT USED
52	CSO/OP70	O	5V	NOT USED
53	CBUSY1	I	5V	INPUT PORT(VOX)
54	CCLK	I	5V	NOT USED(LOW FIXED)
55	CSI	I	5V	NOT USED(HIGH FIXED)
56	IOP91	O	5V	OUTPUT PORT(SIDETONE)
57	IOP92	O	5V	NOT USED
58	FMEMCS/IOP27	O	5V	NOT USED
59	FMEMDO/IOP26	O	5V	NOT USED
60	FMEMDI/IOP25	O	5V	NOT USED

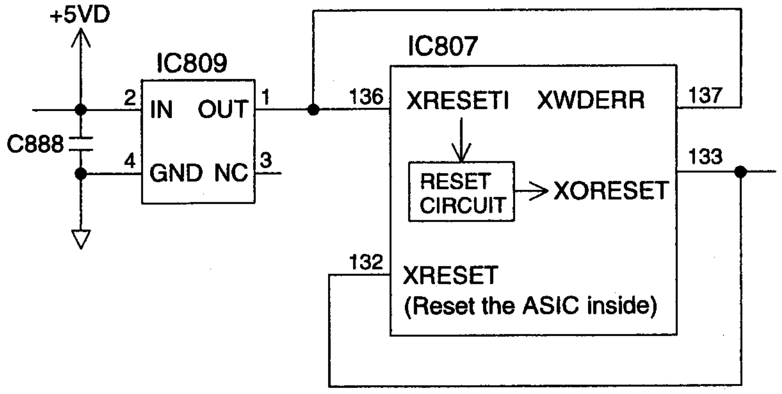
NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
61	FMEMCLK/IOP	I	5V	INPUT PORT (R/B)
62	XRESCS3/OP52	O	5V	OUTPUT PORT(P-SHORT)
63	20KOSC/IOP56	O	5V	NOT USED
64	XHOLDAK	O	5V	NOT USED
65	VDD(3.3V)		3.3V	POWER SOURCE(+3.3V)
66	XOUT	O	3.3V	SYSTEM CLOCK(24MHz)
67	XIN	I	3.3V	SYSTEM CLOCK(24MHz)
68	VSS		GND	POWER SOURCE(GND)
69	VDD(5V)		5V	POWER SOURCE(+5V)
70	XTEST	O	5V	24MHz CLOCK
71	CPUCLK	O	5V	NOT USED
72	TEST1	I	5V	HIGH FIXED
73	TEST2	I	5V	HIGH FIXED
74	TEST3	I	5V	HIGH FIXED
75	TEST4	I	5V	HIGH FIXED
76	XMDMINT	I	5V	MODEM(IC802) INTERRUPT
77	XMDMCS	O	5V	MODEM(IC802) CHIP SELECT
78	VSS		GND	POWER SOURCE(GND)
79	VDD(3.3V)		3.3V	POWER SOURCE(+3.3V)
80	XWAIT/IP60	I	5V	INPUT PORT(MDLSEL)
81	XHOLD/IP61	I	5V	NOT USED(HIGH FIXED)
82	XHSTRD/IOP40	O	5V	NOT USED
83	XHSTWR/IOP41	O	5V	NOT USED
84	XOPRBE/MUT/OP53	O	5V	NOT USED
85	ADR15	O	5V	CPU ADDRESS BUS 15 (NOT USED)
86	ADR14	O	5V	CPU ADDRESS BUS 14 (NOT USED)
87	ADR13	O	5V	CPU ADDRESS BUS 13 (NOT USED)
88	XRAS/IOP42	O	5V	DRAM(IC804) ROW ADDRESS STROBE
89	XCAS1/IOP43	O	5V	DRAM(IC804) CULUM ADDRESS STROBE
90	XCAS2/IOP44	O	5V	DRAM(IC804) ADDRESS9
91	VSS		GND	POWER SOURCE(GND)
92	VDD(3.3V)		3.3V	POWER SOURCE(+3.3V)
93	XRESCS2/OP71	O	5V	OUTPUT PORT(MODEM CSBR)
94	DB3	I/O	5V	CPU DATA BUS 3
95	DB2	I/O	5V	CPU DATA BUS 2
96	DB4	I/O	5V	CPU DATA BUS 4
97	DB1	I/O	5V	CPU DATA BUS 1
98	DB5	I/O	5V	CPU DATA BUS 5
99	DB0	I/O	5V	CPU DATA BUS 0
100	DB6	I/O	5V	CPU DATA BUS 6
101	DB7	I/O	5V	CPU DATA BUS 7
102	VSS		GND	POWER SOURCE(GND)
103	VDD(5V)		5V	POWER SOURCE(+5V)
104	XROMCS	O	5V	ROM(IC808) CHIP SELECT
105	XRD	O	5V	CPU RD
106	XWR	O	5V	CPU WR
107	ADR0	O	5V	CPU ADDRESS BUS 0
108	ADR1	O	5V	CPU ADDRESS BUS 1
109	ADR2	O	5V	CPU ADDRESS BUS 2
110	ADR3	O	5V	CPU ADDRESS BUS 3
111	ADR4	O	5V	CPU ADDRESS BUS 4
112	ADR5	O	5V	CPU ADDRESS BUS 5
113	ADR6	O	5V	CPU ADDRESS BUS 6
114	ADR7	O	5V	CPU ADDRESS BUS 7
115	ADR8	O	5V	CPU ADDRESS BUS 8
116	ADR9	O	5V	CPU ADDRESS BUS 9
117	ADR10	O	5V	CPU ADDRESS BUS 10
118	ADR11	O	5V	CPU ADDRESS BUS 11
119	ADR12	O	5V	CPU ADDRESS BUS 12
120	VSS		GND	POWER SOURCE(GND)
121	VDD(5V)		5V	POWER SOURCE(+5V)
122	RBA0	O	5V	ROM/RAM BANK ADDRESS BUS 0
123	RBA1	O	5V	ROM/RAM BANK ADDRESS BUS 1

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
124	RBA2	O	5V	ROM/RAM BANK ADDRESS BUS 2
125	RBA3	O	5V	ROM/RAM BANK ADDRESS BUS 3
126	RBA4	O	5V	ROM/RAM BANK ADDRESS BUS 4
127	RBA5/OP	O	5V	ROM/RAM BANK ADDRESS BUS 5
128	RBA6/IOP96	I	5V	NOT USED(LOW FIXED)
129	IOP95	I	5V	NOT USED(LOW FIXED)
130	IOP94	I	5V	INPUT PORT(STATUS1)
131	IOP93	I	5V	INPUT PORT(STATUS2)
132	XRESET	I	5V	RESET INPUT
133	XORESET	O	5V	RESET OUTPUT
134	VDD(5V)		5V	POWER SOURCE(+5V)
135	VSS		GND	POWER SOURCE(GND)
136	XRESETI	I	5V	RESET INPUT
137	XWDERR	O	5V	WATCHED ERROR OUTPUT SIGNAL
138	XRSTSWI/IP83	I	5V	NOT USED(HIGH FIXED)
139	XRSTSWO/OP82	O	5V	NOT USED
140	XRESETO	O	5V	NOT USED
141	IOP57	I	5V	INPUT PORT(JOG2)
142	STB1	O	5V	NOT USED
143	STB2	O	5V	NOT USED
144	VDD(3.3V)		3.3V	POWER SOURCE(+3.3V)
145	VSS		GND	POWER SOURCE(GND)
146	STB3	O	5V	NOT USED
147	STB4	O	5V	NOT USED
148	STBNP	I	5V	INPUT PORT(JOG1)
149	THDAT	O	5V	NOT USED
150	THCLK	O	5V	NOT USED
151	THLAT	O	5V	NOT USED
152	RM0/IOP00	O	5V	OUTPUT PORT(STATUS3)
153	RM1/IOP01	O	5V	OUTPUT PORT(STATUS4)
154	RM2/IOP02	O	5V	NOT USED
155	RM3/IOP03	O	5V	NOT USED
156	RXE/IOP04	I	5V	NOT USED(HIGH FIXED)
157	TM0/IOP10	O	5V	OUTPUT PORT(RESET)
158	VDD(5V)		5V	POWER SOURCE(+5V)
159	VSS		GND	POWER SOURCE(GND)
160	TM1/IOP11	O	5V	OUTPUT PORT(SPMUTE)
161	TM2/IOP12	O	5V	NOT USED
162	TM3/IOP13	O	5V	NOT USED
163	TXE/IOP14	I	5V	NOT USED(HIGH FIXED)
164	KSTART	O	5V	OPERATION PANEL CONTROL
165	KLATCH	O	5V	OPERATION PANEL CONTROL
166	KSCLK	O	5V	OPERATION PANEL CONTROL
167	KTXD	O	5V	OPERATION PANEL CONTROL
168	KRXD	I	5V	OPERATION PANEL CONTROL
169	ADSEL1	O	5V	NOT USED
170	VSSC		GND	POWER SOURCE(ANALOG GND)
171	VDDC		3.3V	POWER SOURCE(ANALOG +3.3V)
172	VSSA		GND	POWER SOURCE(ANALOG GND)
173	VDDA		3.3V	POWER SOURCE(ANALOG +3.3V)
174	VREFB	A	3.3V	A/D CONVERTER'S ZERO STANDARD VOLTAGE OUTPUT
175	VCL	A	3.3V	ANALOG PART STANDARD VOLTAGE SIGNAL
176	VREFT	A	3.3V	A/D CONVERTER'S FULL SCALE VOLTAGE OUTPUT

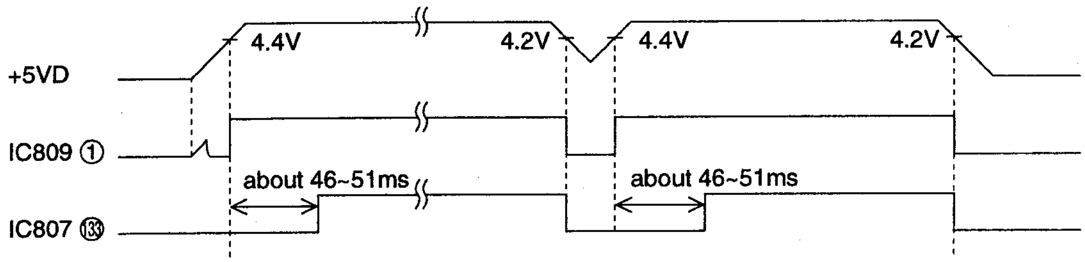
3.2 RESET CIRCUIT (WATCH DOG TIMER)

The output signal from pin 1 of the voltage detect IC (IC809) is input to the ASIC (IC807) 136 pin. Then the output signal from pin 133 of the ASIC (IC807) resets the ASIC.

Circuit Diagram


+5VD
IC809
IN
OUT
GND
NC
2
1
4
3
C888
IC807
136
XRESETI
XWDERR
137
RESET CIRCUIT
XORESET
133
132
XRESET
(Reset the ASIC inside)

1. During a momentary power interruption, a positive reset pulse of 46~51 msec is generated and the system is reset completely.


+5VD
4.4V
4.2V
4.4V
4.2V
IC809 ①
about 46~51ms
about 46~51ms
IC807 ⑬③

2. When pin 132 and 133 of IC807 become low level, they will prohibit the SRAM (IC805) from changing data.
   The SRAM (IC805) will go into the backup mode, when they are backed up by a lithium battery.
3. The watch dog timer, built-in the ASIC (IC807), is initialized by the CPU about every 1.5 ms.
   When a watch dog error occurs, pin 137 of the ASIC (IC807) becomes low level.
   The terminal of the $\overline{\text{WDERR}}$ signal is connected to the reset line, so the $\overline{\text{WDERR}}$ signal works as the reset signal.

3.3 SRAM AND RTC BACK UP CIRCUIT

1) Function

This unit has a lithium battery (BATT) which works for the SRAM (IC805) and Real Time Clock IC (RTC: inside IC807).
The user parameters for autodial numbers, the system setup data and so on are stored in the SRAM (IC805).
The RTC continues functioning, even when the power switch is OFF, backed up by a lithium battery.

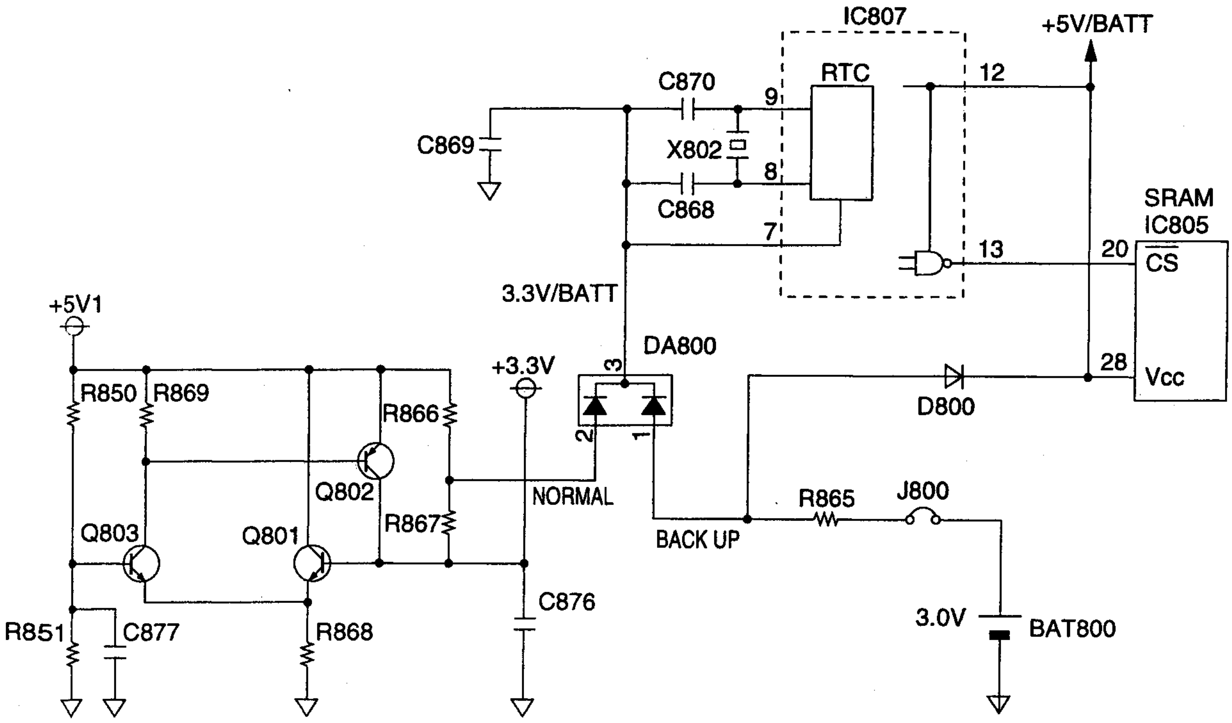
2) SRAM (IC805) Backup Circuit Operation

When the power switch is turned ON, power is supplied through pin 12 of IC807 to the SRAM (IC805). At this time, the voltage at pin 28 of the SRAM is 5V. When the power switch is turned OFF, the BATT supplies power to the SRAM through J801, R865 and D800. The voltage at pin 28 of the SRAM is about +2.5V. When the power switch is OFF and the voltage of +5V decreases, the voltage detect IC (IC809) outputs " Low " level and the IC807 outputs the reset signal. Pin 28 of the SRAM becomes roughly the same voltage as the battery voltage. At this point, pin 20 (CS) of IC805 becomes high level, causing the SRAM to go into the backup mode, in which the power consumption is lower.

3) RTC (IC807) Backup Circuit Operation

When the power switch is turned ON, power is supplied through DA800 to the RTC (inside IC807). At this time, the voltage at pin 7 of IC807 is +3.3V. When the power switch is turned OFF, the BATT supplies power to RTC through DA800. The voltage at pin 7 of IC807 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 7 of RTC (IC807) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram


IC807
+5V/BATT
C870
RTC
9
12
C869
X802
8
C868
7
SRAM
IC805
13
20
$\overline{CS}$
3.3V/BATT
+5V1
DA800
+3.3V
3
28
Vcc
R850
R869
R866
2
1
D800
Q802
NORMAL
R865
J800
Q803
Q801
R867
BACK UP
C876
3.0V
BAT800
R851
C877
R868

3.4 MODEM SECTION

3.4.1 FUNCTION

The unit uses a 1 chip modem (IC802), enabling it to act as an interface between the control section for FAX sending and receiving, and the telephone line. During a sending operation, the digital image signals are modulated and sent to the telephone line.

During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by CCITT. This 1 chip modem (IC802) has hardware which sends and detects all of the necessary signals for FAX communication.

It can be controlled by writing commands from the CPU (IC807: inside ASIC) to the register in the modem (IC802).

This modem (IC802) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.

Overview of Facsimile Communication Procedures (CCITT Recommendation):

1) ON CCITT (International Telegraph and Telephone Consultative Committee)

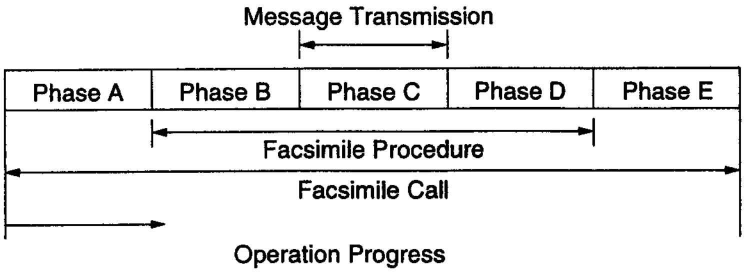
The No. XIV Group of CCITT, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2) Definition of Each Group

- Group I (G1)
  Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines.
  Determined in 1968.
  Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.
- Group II (G2)
  Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes. Methods to suppress redundancy are not used.
  Determined in 1976.
- Group III (G3)
  Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute. Determined in 1980.
- Group IV (G4)
  Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.
  The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3) Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A: Call setting
Call setting can be manual/automatic.
Phase B: Pre-message procedure
Phase B is a pre-processing procedure and sequence for the confirming the status of the terminal, transmission route, etc., and for terminal control. It executes terminal preparation status, determines and displays terminal constants, confirms synchronization status, prepares for transmission of facsimile messages, etc.
Phase C: Message transmission
Phase C is the procedure for the transmission of facsimile messages.
Phase D: Post message procedure
Phase D is the procedure for confirming that the message is completed and received. In the case of continuous transmission, phase B or phase C are repeated for transmission.
Phase E: Call retrieval
Phase E is the procedure for call retrieval, that is for circuit disconnection.

4) Concerning Transmission Time

Transmission Time = Control Time + Image Transmission Time + Hold Time

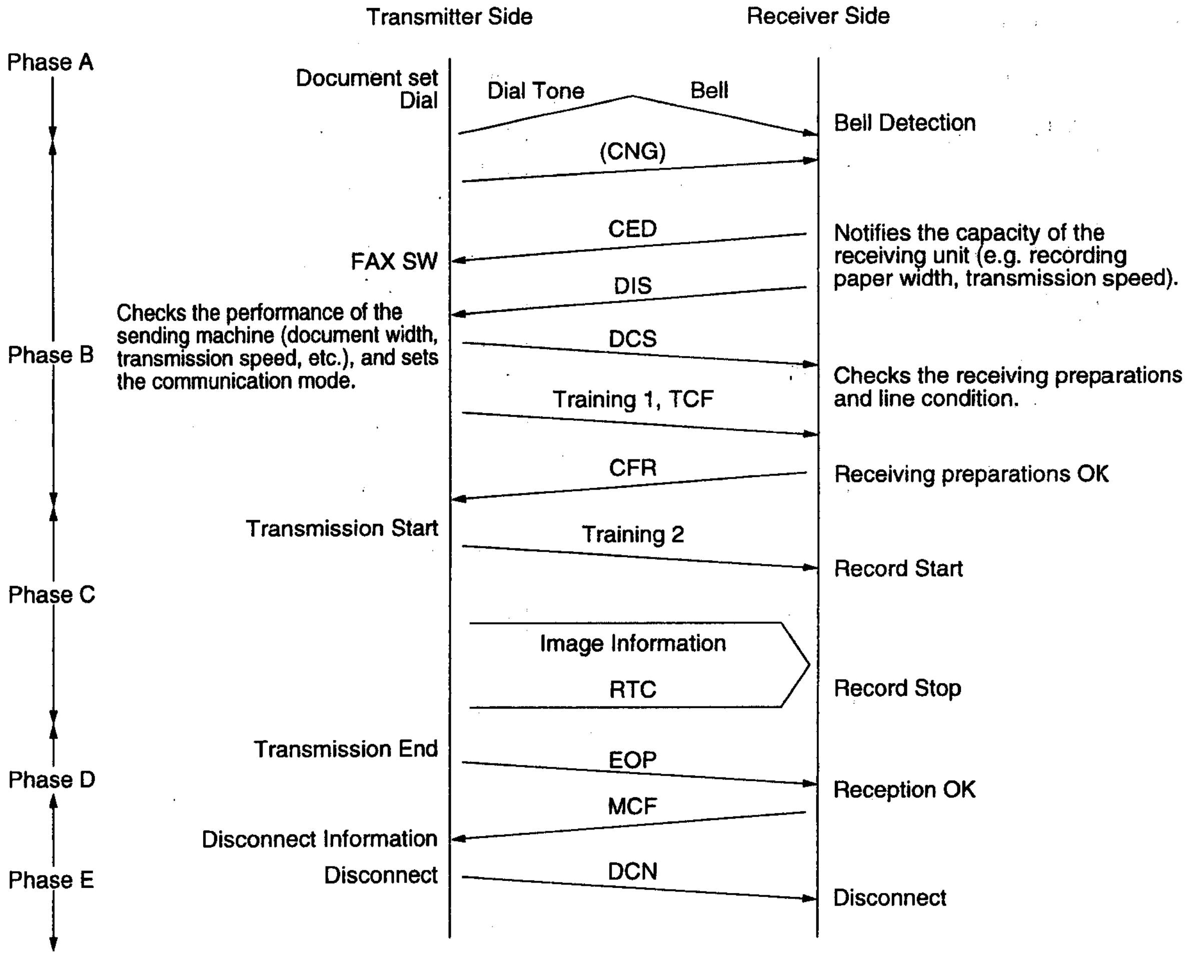
Transmission time consists of the following.
Control time : This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.
Image transmission time:
This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.
Hold time: This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

5) Facsimile Standards

	Telephone Network Facsimile
Item	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6) Explanation of Technology

(1) G3 Communication Signals (T. 30 Binary Process)
For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals.


Transmitter Side
Receiver Side
Phase A
Phase B
Phase C
Phase D
Phase E
Document set
Dial
Dial Tone
Bell
Bell Detection
(CNG)
CED
FAX SW
Notifies the capacity of the receiving unit (e.g. recording paper width, transmission speed).
DIS
Checks the performance of the sending machine (document width, transmission speed, etc.), and sets the communication mode.
DCS
Checks the receiving preparations and line condition.
Training 1, TCF
CFR
Receiving preparations OK
Transmission Start
Training 2
Record Start
Image Information
RTC
Record Stop
Transmission End
EOP
Reception OK
MCF
Disconnect Information
Disconnect
DCN
Disconnect

Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1.
An example of a binary process in G3 communication is shown below.

Explanation of Signals
Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal)
Identification Signal Format.....00000001

Function:
Notifies the capacity of the receiving unit.
The added data signals are as follows.

(Example)
Signal.....DCS (Digital Command Signal)
Identification Signal Format.....X1000001
(Example)

Note: Some models do not support the following items.

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	

Bit No.	DIS/DTC	DCS
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 *ter* fall back mode	2400 bit/s, V.27 *ter*
0, 1, 0, 0	V.27 *ter*	4800 bit/s, V.27 *ter*
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 *ter* and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	V.27 *ter* and V.29 and V.33	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 *ter* and V.29 and V.33 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/25.4mm	R8×7.7 lines/mm and/or 200×200 pels/25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capability
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of 215 mm ± 1%	1728 picture elements along scan line length of 215 mm ± 1%
(0, 1)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1%	2432 picture elements along scan line length of 303 mm ± 1%
(1, 0)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1%	2048 picture elements along scan line length of 255 mm ± 1%
(1, 1)	Invalid	Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23	Minimum scan line time capability of the receiver	Minimum scan line time
(0, 0, 0)	20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	20 ms
(0, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	40 ms
(0, 1, 0)	10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	10 ms
(1, 0, 0)	5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	5 ms
(0, 1, 1)	10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 0)	20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 1)	0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking

Bit No.	DIS/DTC	DCS
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 octets
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PSTN
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field
33	Validity of bits 17, 18	Recording width
(0)	Bits 17, 18 are valid	Recording width indicated by bits 17, 18
(1)	Bits 17, 18 are invalid	Recording width indicated by this field bit information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 picture elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 picture elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.
Note 1 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	————	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this signal.

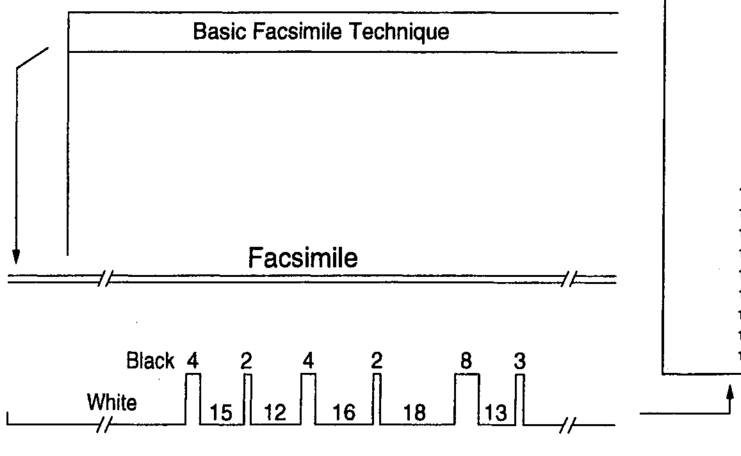
Signal	Identification Signal Format	Function
TCF (Training Check)	————	Sends 0 continuously for 1.5 seconds at the same speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to the sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	————	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	————
RTC (Return to Control)	————	Sends 12 bits (0...01 × 6 times) to the receiver at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

(2) Redundancy Compression Process Coding Mode
This unit uses one-dimensional MH format.

(a) Document

(b) Part of document

(c) Run length and image signals equivalent to (b)



Modified Huffman (MH) Code		
Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

(d) Codification of (c) according to MH formula

00110111101010	011	110101	11	001000	011	101010
(White 400)	(Black 4)	(White 15)	(Black 2)	(White 12)	(Black 4)	(White 16)

11	0100111	000101	000011	10
(Black 2)	(White 18)	(Black 8)	(White 13)	(Black 3)

(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

3.4.2 MODEM CIRCUIT OPERATION

The modem (IC802) has all the hardware satisfying the ITU-T standards mentioned previously.
When the ASIC IC807 (77) is brought to a low level, the modem (IC802) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC807) ADR0-ADR4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC807) according to ITU-T procedures. The INT signal dispatched from IRQ1, 2 (pin 108 and 121 of IC802) to ASIC (IC807) when the transmission data is accepted and the received data is demodulated, the ASIC (IC807) implements post processing. This modem (IC802) has an automatic application equalizer.
With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC802) operates using the 32.256 MHz clock (X800).

1) Facsimile Transmission

The digital image data on the data bus is modulated in the modem (IC802), and sent from pin 69 via ana log ASIC (IC811) and the NCU section to the telephone line.
(See page 92,93)

2) Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 60 of the modem (IC802). The signals that enter pin 60 of the modem (IC802) are demodulated in the board to digital image signals, then placed on the data bus.
In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.
This is designed to correct the characteristics of the frequency band centered about 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.
(See page 92,93)

3) DTMF Transmission (Monitor tone)

The DTMF signal generated in the modem (IC802) is output from pin 69, and is then sent to the circuit on the same route as used for facsimile transmission.
(See page 92,93)
(DTMF Monitor Tone)

4) Call Tone Transmission

This is the call signal which is generated in the ASIC (IC807) and sent to the speaker. (See page)
(See page 92,93)

5) Busy/Dial Tone Detection

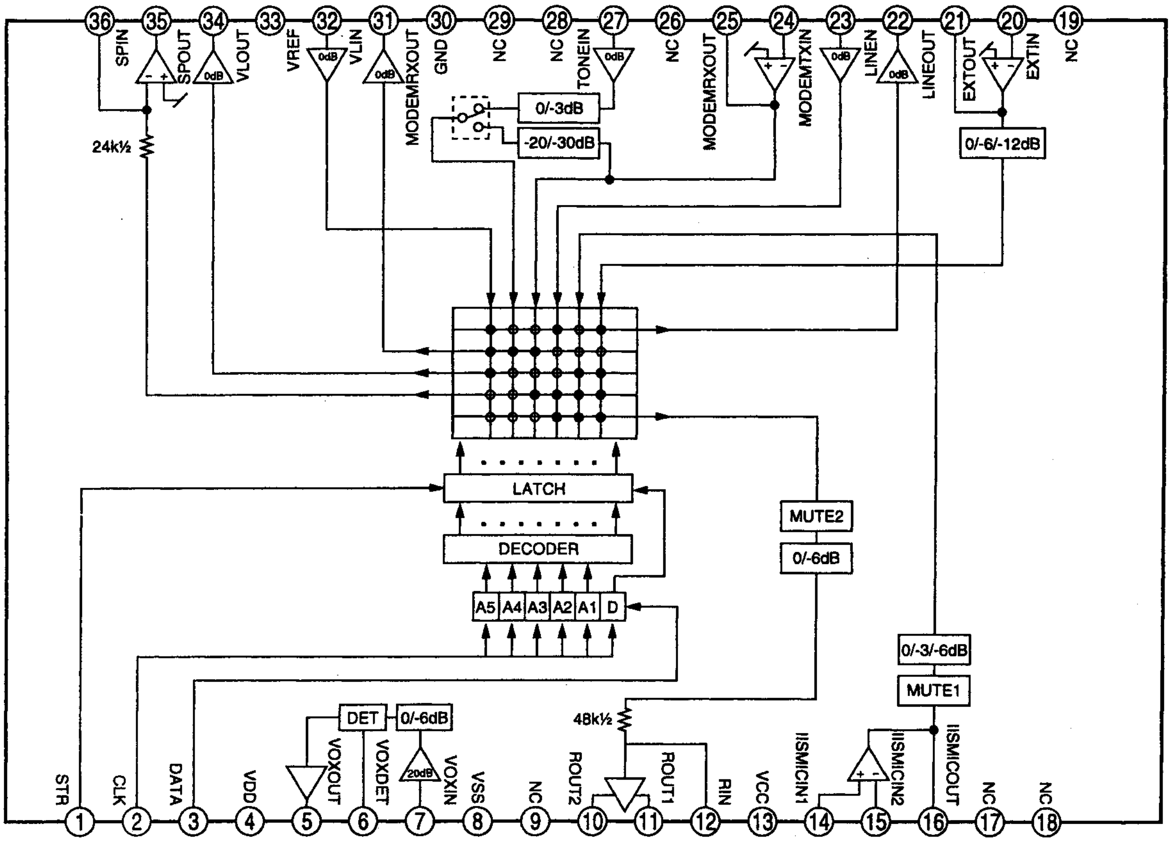
The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC802) becomes 1, and this status is monitored by the ASIC (IC807).
(See page 92,93)

3.5 ANALOG SECTION

3.5.1 ANALOG GATE ARRAY (IC811 on the Digital Board)

This IC can perform signal route switching and level adjustments for various types of analog signals.
This IC incorporates a cross-point switch (CPS), an electronic volume, an auto level controler (ALC) circuit forrecording and an attenuation circuit.
The CPS of this IC is controlled by sending data from digital ASIC.

Internal Connections



㊱ SPIN
㉟ SPOUT
㉞ VLOUT
㉝ VREF
㉜ VLIN
㉛ MODEMRXOUT
㉚ GND
㉙ NC
㉘ NC
㉗ TONEIN
㉖ NC
㉕ MODEMRXOUT
㉔ MODEMTXIN
㉓ LINEN
㉒ LINEOUT
㉑ EXTOUT
⑳ EXTIN
⑲ NC
0dB
0dB
0dB
0dB
0dB
0/-3dB
-20/-30dB
0/-6/-12dB
24k½
LATCH
DECODER
A5
A4
A3
A2
A1
D
MUTE2
0/-6dB
0/-3/-6dB
MUTE1
DET
0/-6dB
20dB
48k½
① STR
② CLK
③ DATA
④ VDD
⑤ VOXOUT
⑥ VOXDET
⑦ VOXIN
⑧ VSS
⑨ NC
⑩ ROUT2
⑪ ROUT1
⑫ RIN
⑬ VCC
⑭ IISMICIN1
⑮ IISMICIN2
⑯ IISMICOUT
⑰ NC
⑱ NC

Explanation of ANALOG GATE ARRAY (IC811 on the DIGITAL Board)

No.	Name	Function	No.	Name	Function
1	STR	Strobe input	19	NC	Not used
2	CLOCK	Clock input	20	EXTIN	EXT amp output
3	DATA	Data input	21	EXTOUT	EXT amp input
4	VDD	Logic power supply	22	LINEOUT	Line amp output
5	VOXOUT	VOX output	23	LINEIN	Line amp input
6	VOXDET	VOX detection adjustment	24	MODEMTXIN	MODEM TX amp input
7	VOXIN	VOX input	25	MODEMTXOUT	MODEM TX amp output
8	VSS	Logic ground	26	NC	Not used
9	NC	Not used	27	TONEIN	Tone amp input
10	ROUT2	HS receiver amp output2	28	NC	Not used
11	ROUT1	HS receiver amp output1	29	NC	Not used
12	RIN	HS receiver amp input	30	GND	Analog ground
13	VCC	Analog ground	31	MODEMRXOUT	MODEM RX amp output
14	HSMICIN1	HS mic amp input1	32	VLIN	Volume amp input
15	HSMICIN2	HS mic amp input2	33	VREF	reference voltage output
16	HSMICOUT	HS mic amp output	34	VLOUT	Volume amp output
17	NC	Not used	35	SPOUT	Speaker amp output
18	NC	Not used	36	SPIN	Speaker amp input

3.5.2 DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1) **Function**

The analog section works as an interface between the telephone line.

The analog ASIC (IC811) on the digital board exchanges FAX TX and RX signals between the MODEM (IC802) and the analog section.

The control signals transmitted to the analog section are output mainly from ASIC IC807, and the analog status is stored as data in ASIC IC807.

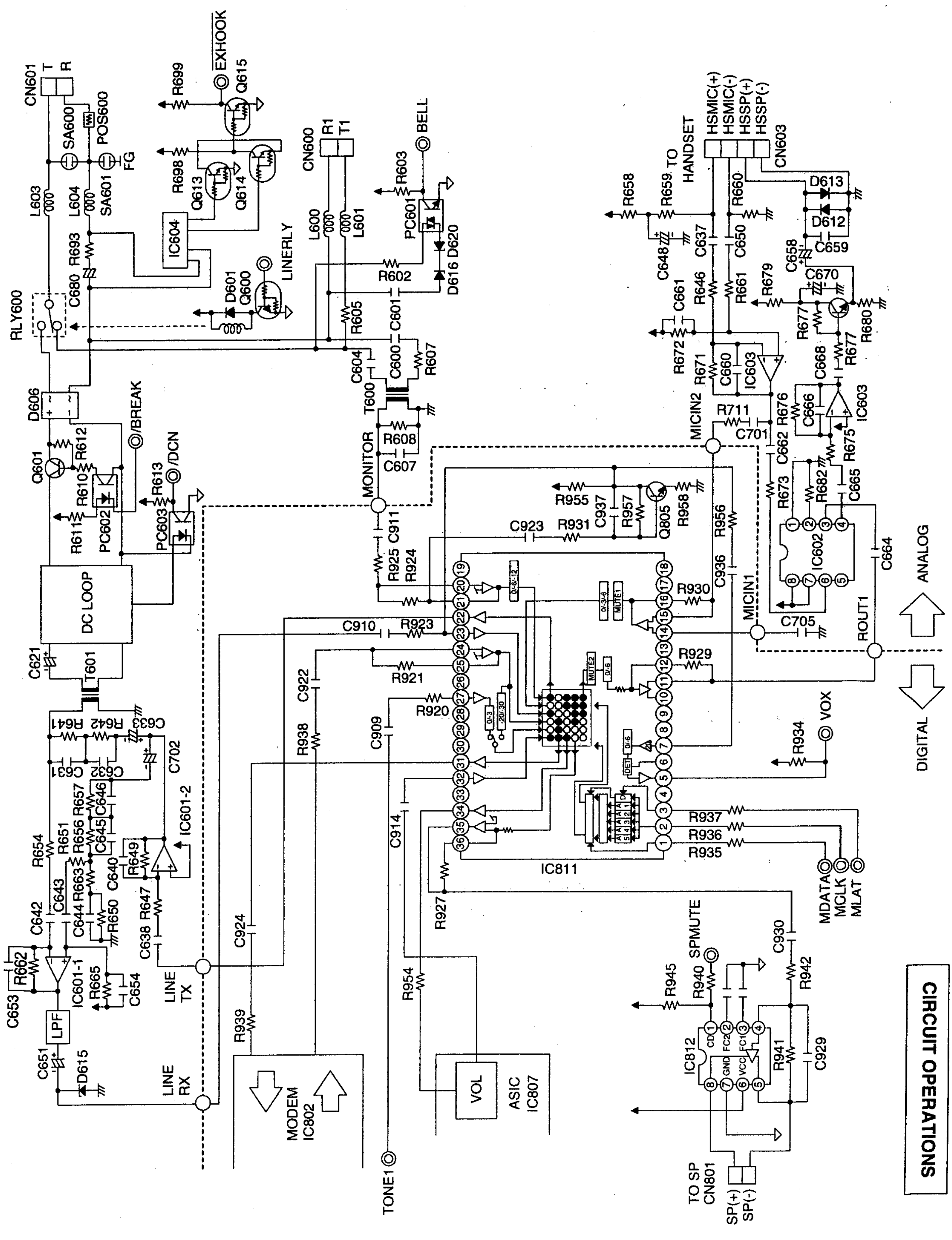
2) **Circuit Operation**

[NCU]:Network Control Unit

The NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detction circut; Pulse dial generation circuit; Extension phone line off-hook detection circuit; Sidetone circuit; Remote fax activation circuit.

Refer to **NCU SECTION** for the details.

Block Diagram


CN601
T
R
SA600
POS600
SA601
FG
L603
L604
R693
C680
RLY600
D606
Q601
R612
R610
R611
PC602
/BREAK
R613
/DCN
PC603
DC LOOP
C621
T601
R641
R642
C633
C631
C632
C702
R654
R651
R656
R657
C645
C646
R649
IC601-2
C643
R663
C640
C642
C644
R650
R647
C638
R662
C653
IC601-1
R665
C654
LPF
C651
D615
LINE TX
LINE RX
R699
EXHOOK
Q615
R698
Q613
Q614
IC604
D601
Q600
LINERLY
CN600
R1
T1
L600
L601
R605
C601
R602
R603
BELL
PC601
D620
D616
C604
C600
R607
T600
R608
C607
MONITOR
C911
R925
R924
C910
R923
R921
C922
R920
R938
C909
C914
C924
R939
MODEM
IC802
R954
R927
VOL
ASIC
IC807
TONE1
R955
C937
R957
Q805
R958
C923
R931
R956
C936
R930
IC811
0/-6/-12
0/-3/-6
MUTE1
MUTE2
0/-6
0/-3
-20/-30
DET
MICIN1
MICIN2
R929
R934
VOX
R937
R936
R935
MDATA
MCLK
MLAT
C705
ROUT1
C664
ANALOG
DIGITAL
R711
C701
C662
R673
R682
C665
IC602
R676
C666
R675
IC603
C668
R677
R680
R679
C670
C658
C659
D612
D613
R658
R659
TO HANDSET
C648
C637
C650
R660
R646
R661
C661
R672
R671
C660
CN603
HSMIC(+)
HSMIC(-)
HSSP(+)
HSSP(-)
SPMUTE
R945
R940
C930
R942
IC812
CD
FC2
FC1
GND
VCC
R941
C929
TO SP
CN801
SP(+)
SP(-)

3.6 NCU SECTION

3.6.1 GENERAL

This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL line relay (RLY600), bell detection circuit, pulse dial circuit, TAM interface circuit, line amplifier and sidetone circuits and a multiplexer.

3.6.2 EXT. TEL. LINE RELAY (RLY600)

1. Circuit Operation

Normally, this relay switches to the external telephone side (break) and switches to the open side (make) while OFF-HOOK.

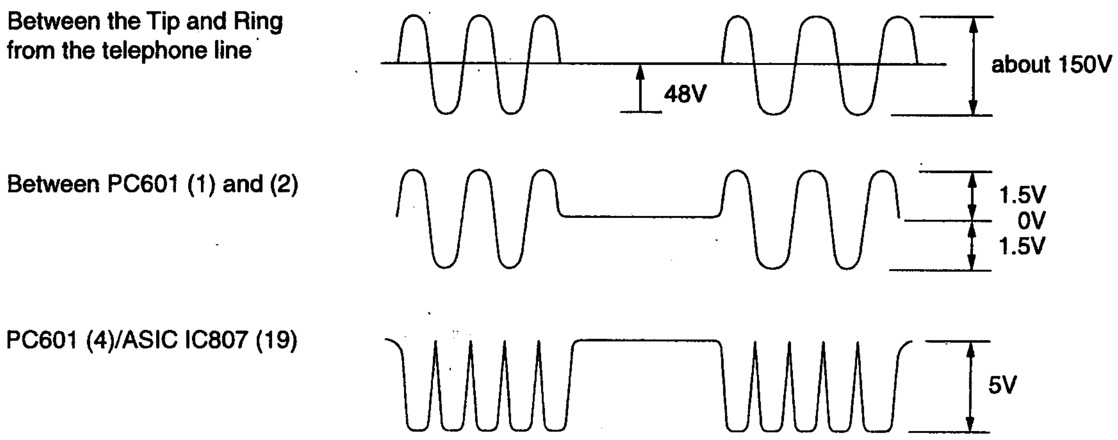
{ IC807 (17) High Level → CN800 (16) High Level } → CN602 (16) High Level → Q600 ON → RLY600 (make)

3.6.3 BELL DETECTION CIRCUIT

1. Circuit Operation

The signal waveform for each point is indicated below. The signal (low level section) input to pin 19 of ASIC IC807 on the digital board is read by ASIC and judged as a bell.

TEL LINE → PC601 (1, 2 - 4) → IC807 (19)


Between the Tip and Ring from the telephone line
48V
about 150V
Between PC601 (1) and (2)
1.5V
0V
1.5V
PC601 (4)/ASIC IC807 (19)
5V

3.6.4 TAM INTERFACE CIRCUIT

This circuit is to switch between FAX receiving and the external TAM's message recording automatically. This circuit consists of an EXT. TAM OFF-HOOK detect circuit, monitor transformer, multiplexer, amplifier, and VOX detect circuit.
For details, please refer to 3.9. TAM INTERFACE SECTION.

3.6.5 LINE AMPLIFIER AND SIDE TONE CIRCUIT

Circuit Operation

The reception signal output from the line transformer T601 is input to pin (2) of IC601 via R654,C642 and R663,and then the signal is amplifier at pin (1) of IC601 and sent to the reseption system 5.9dB.
The transmission signal goes through C638, R714, R647 and enters IC601 pin(6), where the signal is amplified to about 17.7dB.
Then, it is output from pin (7) of IC601 and transmitted to T601 via C633,R642 and R641.
If the side tone circuit is not applied, the transmossion signal will return to the reception amplifier via C702,R657,R655,R651 and C643.When the side tone circuit is active, the signal oputput from IC601 pin(7) passes through C702,R657,R655,R651,C643 ,R664 and goes into the amplifer IC601 pin (3).
This circuit is used to cancel the transmission return signal.

The TX signal is output to the circuit analog the route from the IC601 7pin →C633 →R642 →R641 →T601→TEL LINE. However, if balance is lost in the bridge ,a voltage occurs between the IC601 2pin and 3pin and a sidetone results.because the balance cannot be maintained completely at all frequencies in rhe audio range,some sidetone always occur.

3.6.6 REMOTE FAX ACTIVATION CIRCUIT

(1) Function

Another telephone connected to same line activates the unit to the FAX mode by using a DTMF signal.

(2) Signal Path

TEL Line→T600→ C911→R925→IC811(20-31)→ C924→ R939 → IC802(60)

3.7 ITS (Integrated telephone System) and MONITOR SECTION

3.7.1 GENERAL

The general ITS operation is performed by the special IC802 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC807 (digital board). During the pulse dial operation, the monitor tone is output from the ASIC IC807.

3.7.2 TELEPHONE MONITOR

1. Function

This is the function when you are not holding the handset and can hear the caller's voice from the line.

2. Signal path

Refer to page 92, 93.

3.7.3 HANDSET CIRCUIT

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal path (Transmission signal)

Refer to page 92, 93.

3. Signal path (Reception signal)

Refer to page 92, 93.

3.7.4 MONITOR CIRCUIT

1. Function

This circuit monitors various tones, such as ①DTMF tone, ②Alarm/Beep/Key tone/Bell ③Dummy ring back tone.

2. Signal path

a. DTMF MONITOR

(Speaker Operation)
Refer to page 92, 93.
(Handset Operation)
Refer to page 92, 93.

b. ALARM/BEEP/KEY TONE/BELL

Refer to page 92, 93.

c. DUMMY RING BACK TONE

Refer to page 92, 93.

3.8 AUTO DISCONNECT CIRCUIT

(1) Function

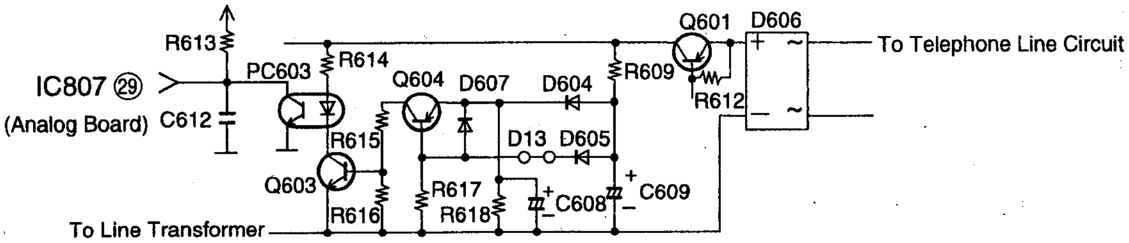
This circuit used to detect that the telephone connected in parallel to the same line is OFF-hook while the unit picks up the line. If this detection circuit is activated when TAM is being delivered, the delivery stops and the circuit is automatically released.

(2) Circuit Operation

If the line is picked up, C608 is charged by following the path shown below.

D606(+) → Q601 → R609 → D604 → C608

When the electric potential difference between the base and emitter of Q604 becomes less than about 0.3V, Q604 and Q603 and PC603 turn off, then the IC807 pin 29 becomes a high level.
In this condition, if a telephone connected in parallel goes into OFF-hook status, the base of Q604 becomes low.
On the other hand, the emitter of Q604 goes down because the capacitor (C608) is charged. Q604 turns on when the electric potential difference between the base and emitter of Q604 becomes more than 0.6V while being charged.
When Q604 turns on, Q603 and PC603 also turn on, then the IC807 pin 29 becomes a low level.


R613
IC807 ㉙
(Analog Board)
C612
PC603
R614
Q604
D607
D604
R609
Q601
D606
To Telephone Line Circuit
R612
R615
D13
D605
Q603
R617
R618
C608
C609
R616
To Line Transformer

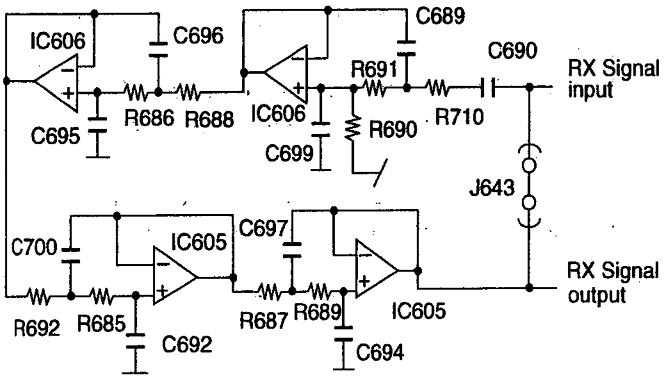
3.8.1 LOW PASS FILTER

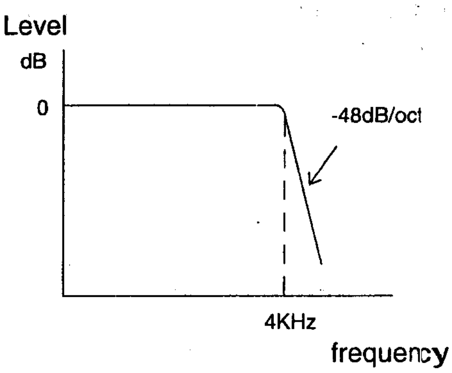
(1) Function

This circuit is only incorporated in products intended for Germany. Non-German products are shorted by J643. This low pass filter attenuates the 16-kHz account signal from the commutator to eliminate influence on the conversation and communication.

(2) Circuit Operation

This low pass filter is an eight-order active filter, and the cutoff frequency is approximately 4 kHz.


IC606
C696
C689
C690
R691
RX Signal input
C695
R686
R688
IC606
R690
R710
C699
J643
C700
IC605
C697
RX Signal output
R692
R685
R687
R689
IC605
C692
C694



3.8.2SPECIAL CIRCUIT ON THE ANALOG BOARD

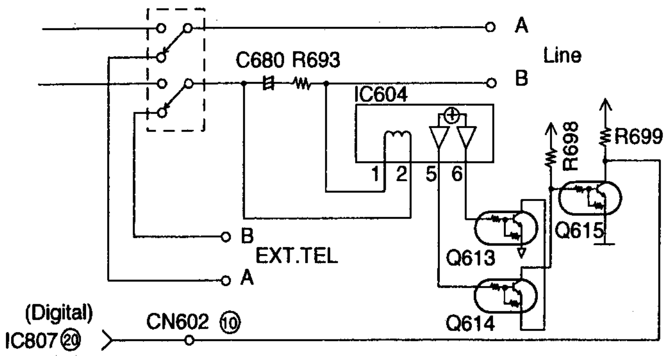
CURRENT DETECTION CIRCUIT

(1) Function

This circuit detects whether the circuit current is flowing or not. It is also used for CPC detection and Ext. Tel Hook detection.

(2) Circuit Operation

If a circuit current of 10 mA or more flows in the IC604 coil when the unit or Ext. Tel is OFF-hook, the IC604 internal sensor detects this current. Then depending on the direction of the current, the IC604-5 pin or 6 pin switches to a low level. Next, Q613 or Q614 is turned off, Q615 is turned on, and Gate Array IC807-20 pin on the digital board switches to a low level. If the line is cut off, the opposite operation is executed and the IC807-20 pin switches to a high level.


RLY600
A
Line
B
C680 R693
IC604
1 2 5 6
R698
R699
B
EXT.TEL
A
Q613
Q615
Q614
(Digital)
IC807⑳
CN602 ⑩

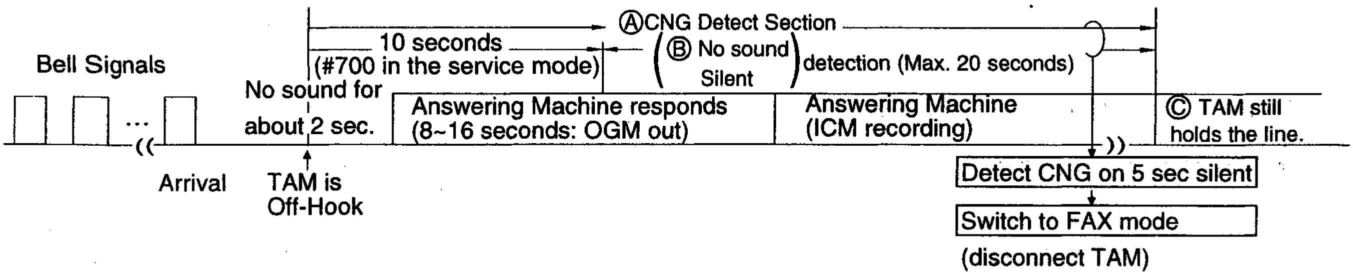
3.9 TAM INTERFACE SECTION

3.9.1 FUNCTION

If EXT. TAM is selected in the Receive mode, the unit receives documents for FAX calls or the external TAM records a voice message automatically.

To switch between the answering machine and facsimile in the EXT. TAM Mode.

#	EXTERNAL TAM OPERATION	UNIT OPERATION
1	When the bell signal rings as many times as the number installed in the connected answering machine (TAM), the answering machine seizes the line and the answering message is sent out to the line. (OGM out for 8 ~ 16 sec.)	The length of the answering message should be 8~16 seconds. While the message is being played, the unit starts to detect the CNG signal.(Ⓐ) If the unit detects the CNG signal, it OK to FAX receiving and disconnects the external TAM automatically.
2	After sending the OGM, the answering machine starts to record the message of the other party (ICM recording).	After the OGM of the external TAM is finished, the unit starts to detect approximately 5 seconds of no sound detection. (Ⓑ) If no sound is detected, the unit will switch to FAX receiving and disconnect the external TAM automatically. If the unit cannot detect the CNG signal or no sound for about 30 seconds, the unit will not hold the line. (Ⓒ)



ⒶCNG Detect Section
10 seconds
(#700 in the service mode)
(Ⓑ No sound Silent) detection (Max. 20 seconds)
Bell Signals
No sound for about 2 sec.
Answering Machine responds (8~16 seconds: OGM out)
Answering Machine (ICM recording)
Ⓒ TAM still holds the line.
Arrival
TAM is Off-Hook
Detect CNG on 5 sec silent
Switch to FAX mode
(disconnect TAM)

Attention 1: No sound detection lasts 20 seconds after the telephone call is received at the answering machine. If there is no sound for more than 5 seconds (#701 in the service mode), it switches to the facsimile.

Attention 2: When the answering machine cannot answer the telephone call because of disconnection or the recording tape is full, the unit picks up the call after 5 rings (#702 in the service mode). Then it switches to the facsimile.

3.9.1.1 CIRCUIT OPERATION

The TAM INTERFACE circuit consists of an EXT. TAM HOOK detection circuit, CNG signal from the other party's detection circuit, VOX detection circuit (to judge sound/no-sound) and RL101 (to separate EXT. TAM).

1. EXT. TAM HOOK detection circuit

A bell is received at EXT. TAM and EXT. TAM is connected to the line, making a DC LOOP. Then, IC604 detects this current. During detection, EX-H00K1becomes low.

(DC LOOP)
Tip → L603 → RLY600(3,2) → R605 → J634 → L601 → Tip1 → (EXT.TAM) → Ring 1 → L600 → RL600(7, 6) →
IC604(1,2) → L604 → POS600 → Ring

2. CNG signal detection circuit

The CNG signal from the other party's FAX is detected in MODEM IC802 (digital board).

(Signal path)
Refer to page 92, 93.

3. VOX

The VOX circuit detects if there is a signal or voice on the line. This is why the VOX circuit reacts to the OGM of the EXT.TAM and ICM from the other party.

(Signal path)
Telephone Line ——→ C604 → T600 → CN604(10) → {CN801(10) → C911 → R925 → IC811(20, 21) → C923 →
EXT.TEL Line → R605 ┘
R931 → Q805(B, C) → C936 → R956 → IC811(7, 5) → IC807(53)}

4. Remote receiving

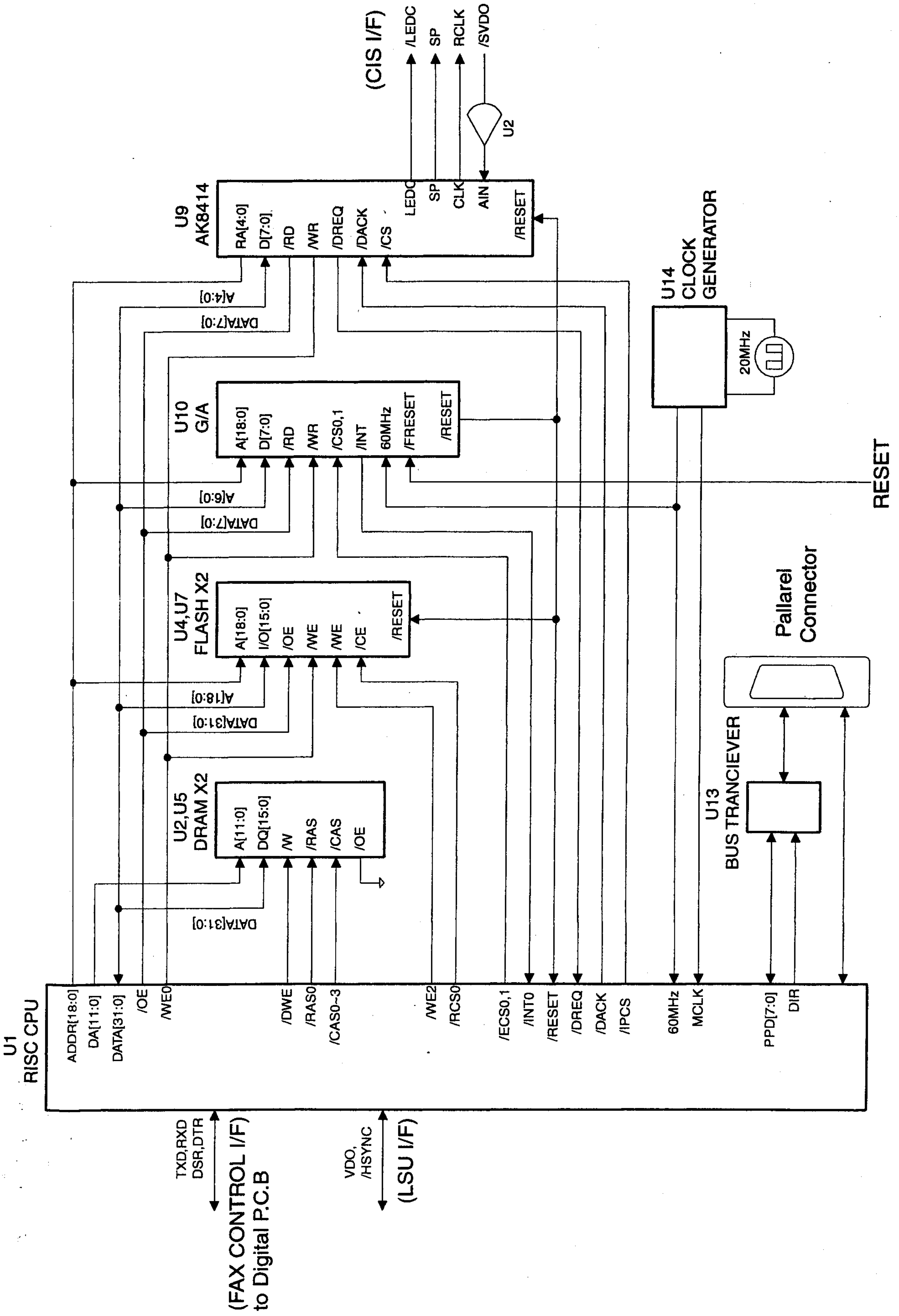
This is the parallel-connected DTMF signal for the TEL or EXT.TEL mode between T and R. When the other party is a FAX, the unit switches to FAX receiving.

(Signal Path)
Detects the DTMF signal in the MODEM.

{ } : Inside the digital board

4. PRINTER CONTROLLER SECTION

Printing Controller Bord Block Diagram

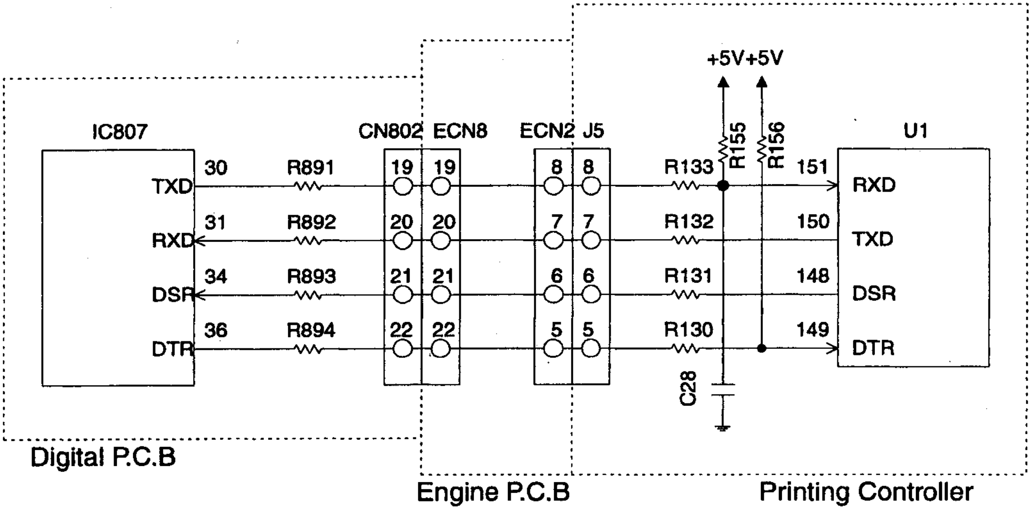

(CIS I/F)
/LEDC
SP
RCLK
/SVDO
U2
U9
AK8414
RA[4:0]
D[7:0]
/RD
/WR
/DREQ
/DACK
/CS
LEDC
SP
CLK
AIN
/RESET
A[4:0]
DATA[7:0]
U10
G/A
A[18:0]
D[7:0]
/RD
/WR
/CS0,1
/INT
60MHz
/FRESET
/RESET
U14
CLOCK
GENERATOR
20MHz
RESET
A[6:0]
DATA[7:0]
U4,U7
FLASH X2
A[18:0]
I/O[15:0]
/OE
/WE
/WE
/CE
/RESET
A[18:0]
DATA[31:0]
Pallarel
Connector
U2,U5
DRAM X2
A[11:0]
DQ[15:0]
/W
/RAS
/CAS
/OE
U13
BUS TRANCIEVER
DATA[31:0]
U1
RISC CPU
ADDR[18:0]
DA[11:0]
DATA[31:0]
/OE
/WE0
/DWE
/RAS0
/CAS0~3
/WE2
/RCS0
/ECS0,1
/INT0
/RESET
/DREQ
/DACK
/IPCS
60MHz
MCLK
PPD[7:0]
DIR
TXD,RXD
DSR,DTR
(FAX CONTROL I/F)
to Digital P.C.B
VDO,
/HSYNC
(LSU I/F)

4.1. FAX CONTROL PRINTER CONTROLLER COMMUNICATION

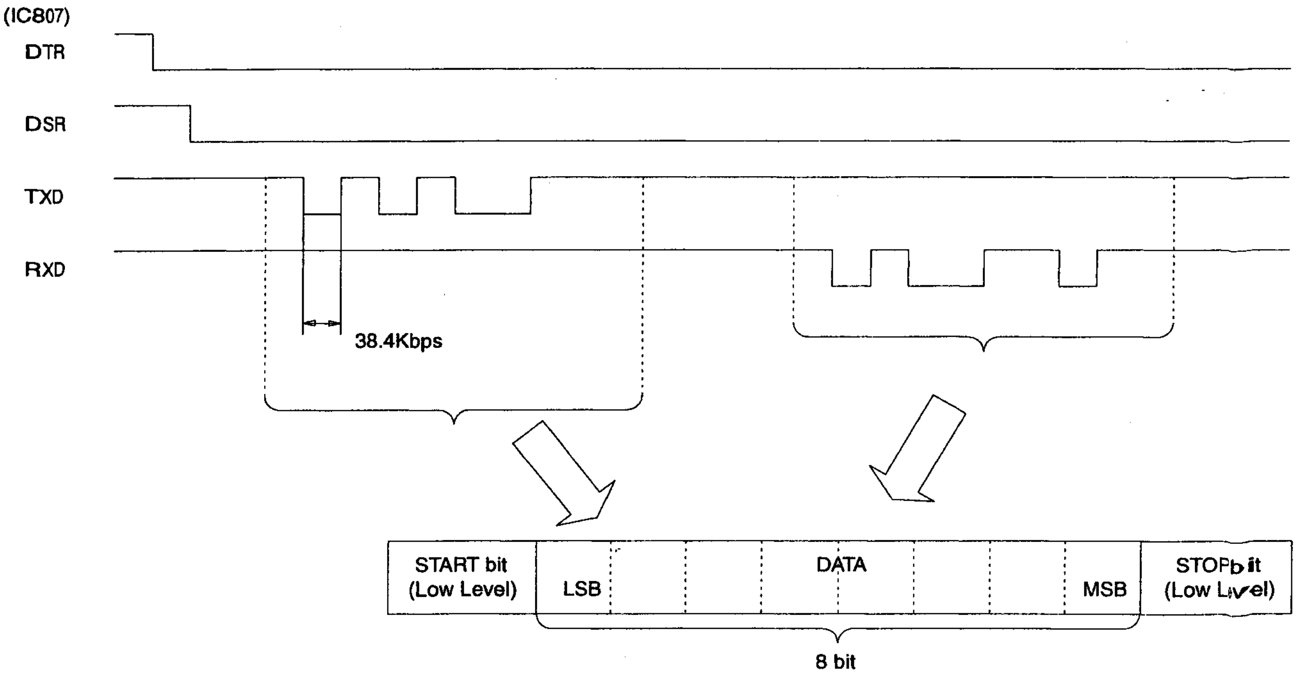
Fax control section and printing controller communicate command, status and compressed image data each other by serial communication in conformance with the specifications of EIA standard No. RS-232C.

This communication speed is 38.4Kbps.
1 character consists of 1 start bit, 8bits data and 1 stop bit as shown below.

Circuit Diagram


IC807
TXD
RXD
DSR
DTR
30
31
34
36
R891
R892
R893
R894
CN802
ECN8
19
20
21
22
ECN2
J5
8
7
6
5
+5V
+5V
R155
R156
R133
R132
R131
R130
C28
151
150
148
149
U1
RXD
TXD
DSR
DTR
Digital P.C.B
Engine P.C.B
Printing Controller

Timing chart


(IC807)
DTR
DSR
TXD
RXD
38.4Kbps
START bit
(Low Level)
LSB
DATA
MSB
STOP bit
(Low Level)
8 bit

4.2 PRINTER CONTROLLER BOARD

4.2.1 Overall block Diagram

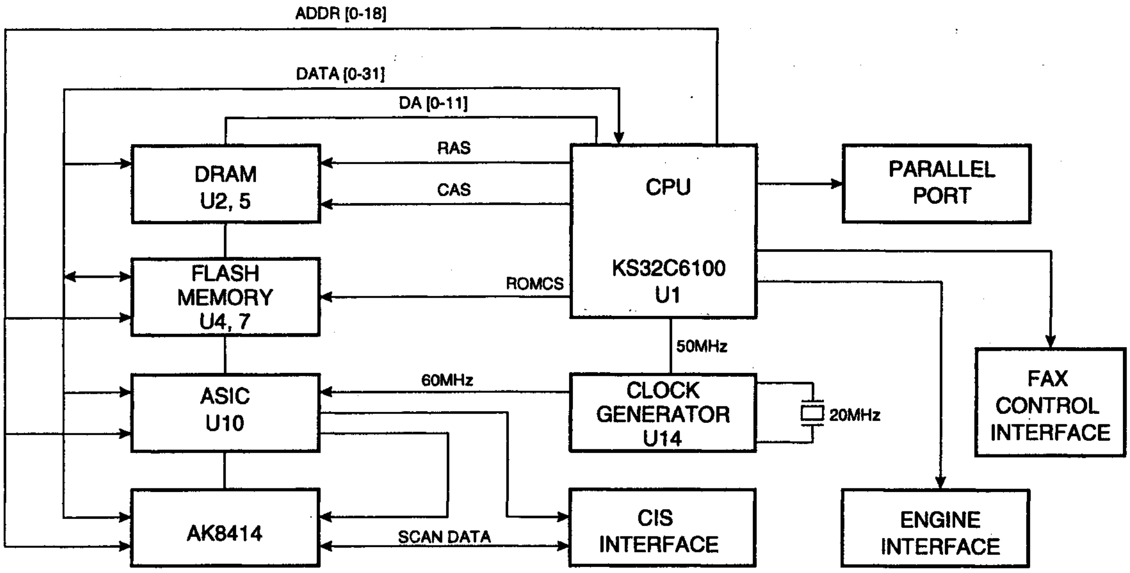

ADDR [0-18]
DATA [0-31]
DA [0-11]
RAS
CAS
ROMCS
DRAM
U2, 5
FLASH
MEMORY
U4, 7
ASIC
U10
AK8414
CPU
KS32C6100
U1
50MHz
60MHz
CLOCK
GENERATOR
U14
20MHz
SCAN DATA
CIS
INTERFACE
PARALLEL
PORT
FAX
CONTROL
INTERFACE
ENGINE
INTERFACE

FIG. 4-8

- **The printing controller board is comprised of the following.**

  - CPU (KS32C6100 32 BIT RISC MICROCONTROLLER)
  - CLOCK GENERATOR
  - DRAM
  - FLASH MEMORY
  - G/A
  - IMAGE PROCESSOR (AK8414)

4.2.2 CPU (KS32C6100 32 BIT RISC MICROCONTROLLER)

4.2.2.1 Introduction

KS32C610016/32-bit RISC microcontroller provides a cost-effective and high-performance microcontroller solution for laser beam printers (LBP) with PCL/PDL interpreters. To accelerate raster image generation, the KS32C6100 directly processes scanned image data for the laser printer engine.

An outstanding feature of the KS32C6100 is its CPU core, a 16/32-bit RISC processor (ARM7TDMI) designed by Advanced RISC Machines, Ltd. The ARM7TDMI core is a low-power, general-purpose, microprocessor macrocell that was developed for use in application-specific and customer-specific integrated circuits. Its simple,elegant, and fully static design is particularly suitable for cost-sensitive and power-sensitive applications.

The KS32C6100 was developed using the ARM7TDMI core, 0.5-µm standard cells, and a data path compiler. Most of the on-chip function blocks were designed using a HDL synthesizer.

By providing a complete set of common system peripherals, the KS32C6100 minimizes overall system costs and eliminates the need to configure additional components.

The main integrated on-chip function blocks which are described in this document include:

- ROM /SRAM /DRAM controller
- 4Kbyte Instruction /Data cache
- Three -channel DMA controller
- UART / Sirial IO
- Parallel port interface controller (PPIC)
- Five 16-bit timers including tone generator and watch dog timer
- Printer interface controller (PIFC)
- Graphic engine unit (GEU)
- Image functional unit including image expander, image rotator, VIS and halftoner
- Programmable I/O ports
- Interrupt controller

4.2.2.2 FEATURES

Architecture

- Completely integrated system for embedded applications, especially laser beam printers
- Fully 16/32-bit RISC architecture
- Efficient and powerful ARM7 TDMI CPU core
- 4-kbyte instruction/data cache
- External bus master mode support
- Cost-effective JTAG-based debug solution

Unified Cache

- 4-Kbyte unified cache
- 2-way set-associative configuration
- Two non-cacheable data regions can be specified
- Cache disable by software
- Four-word depth write buffer

System manager

- 256-Mbyte virtually addressable space support
- 8-bit,16-bit, or 32-bit external bus support for ROM, SRAM, DRAM, and external I/O
- Separate address and control signals specially for DRAM access, and CAS before RAS refresh, DRAM self-refresh, fast page and EDO DRAM access modes support
- Programmable memory bank size and location definition to provide a flexible memory map.
- Programmable memory access times (2 to 7 waiting cycles)
- Cost -effective memory-to-peripheral interface

DMA

- Three -channel general-purpose DMA controller
- Memory-to-memory, serial Me port /from-memory, parallel port-to/from-memory data transfers without CPU intervention
- Run-length compression/decompression support for memory-to-memory data transfer in CDMA channel
- Initiated by software, peripherals or external DMA request
- Increment or decrement of source or destination addresses, and 8-bit (byte),16-bit(half-word) or 32-bit (word) data transfer support

UART /SIO

- Two-channel SIO with DMA-based or interrupt-based operation; supports 5-bit, 6-bit, 7-bit, or 8-bit serial data transmit/receive
- Programmable baud rates
- Loop back mode for testing
- Infra-red (IR) Tx/Rx support

Parallel Port Interface Controller

- DMA-based or interrupt-based operation
- Support IEEE Standard 1284 communication modes (Compatibility mode, nibble mode, byte mode, and ECP mode)
- Hardware support for RLE data compression or decompression in ECP mode
- Automatic handware hardshaking for forward or reverse data transfers in Compatibility and ECP modes.

Timer/Tone Generator/Watch Dog Timer

- Five programmable 16-bit timers , including one tone generator and one watch dog timer
- Watch dog timer output support for system reset
- Interval mode or toggle mode operation support for tone generator

Graphic Engine Unit (GEU)

- Hardware support for up to 256 Bit Block Transfer (Bitblt) operations
- X-Y coordinates support for source, pattern and destination data
- Scanline transfer support to reduce image storage requirements
- Source or pattern filpping
- Band fault check support

Image Function Block

- Two and three-times image expanding function support
- 90/270 degree rotation support for 16x16 data block
- Variable image scaling operation support
- Halftoning operation support for gray-level image conversion

Printer Interface Controller

- Cost -effective, high-performance DMA-based interface to the printer engine
- Dedicate DMA for fast data transfers between page memory and the printer engine
- Consecutive zero string (Blank data) output for banded bit maps (no memory access required)
- Queuing operation to facilitate smooth switching among data blocks of banded page memory
- Pixel chopping mode support for LBP toner save
- Dot shrinking mode support for fine-edged images printing
- Video data/boundary polarity defining support
- Two to four-times image expanding support

I/O Ports

- 16 programmable I/O ports
- Each port pin can be configured individually as input, output, or I/O for a dedicated signal

Interrupts

- 27 interrupt sources (2 external interrupts interrupt sources27 included)
- Normal or fast interrupt modes (IRQ, FIQ)

Operating Voltage Range

- 4.75 to 5.25 volts

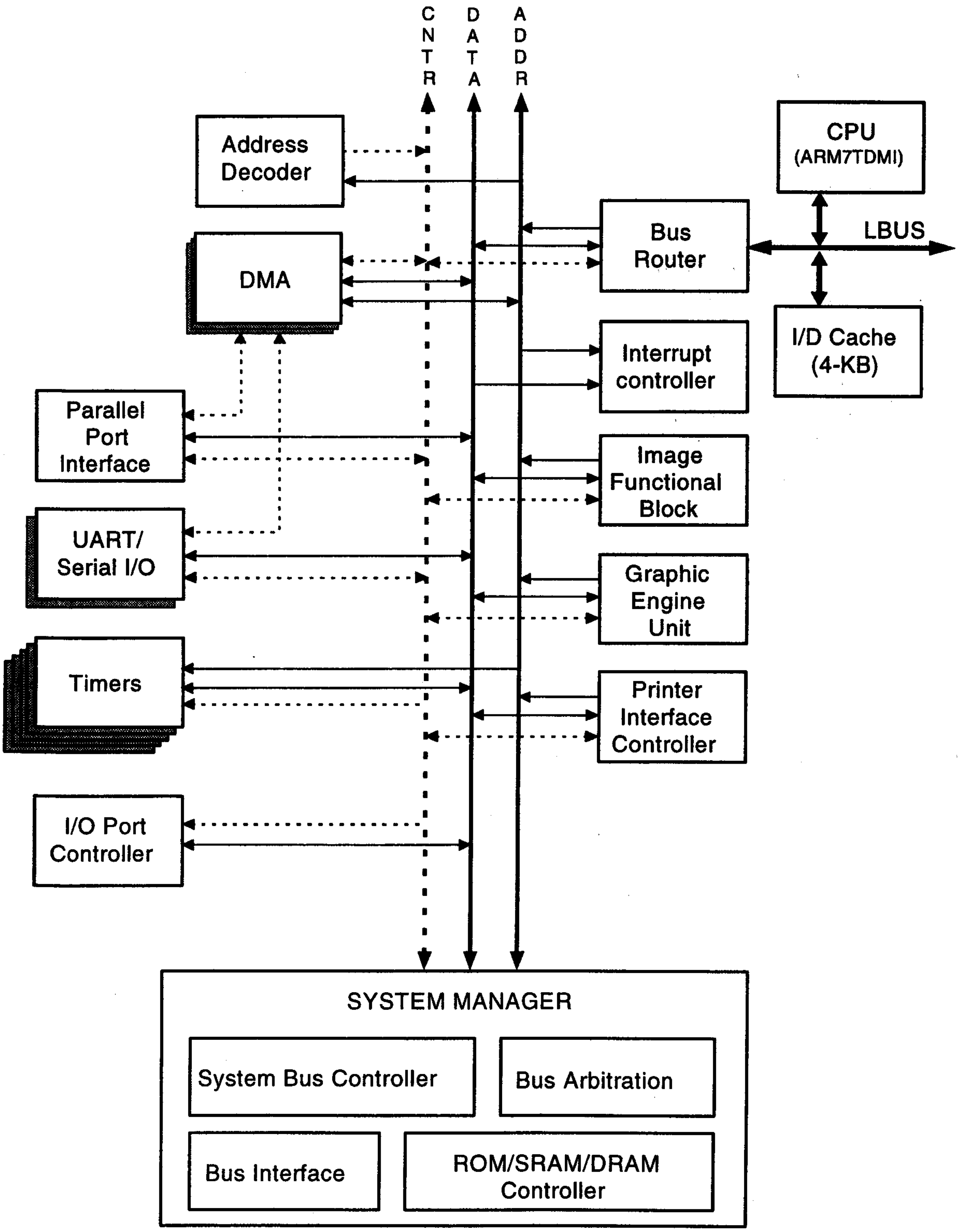
Operating Frequency

- up-to 33MHz

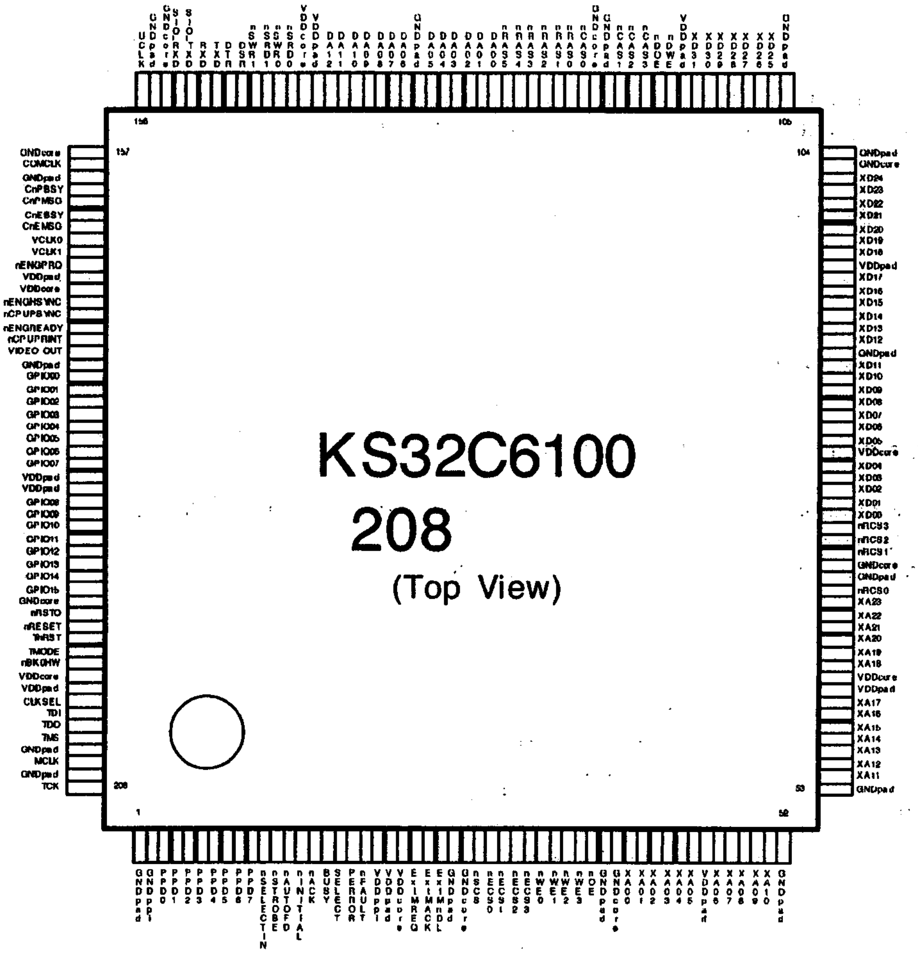
Package Type

- 208 -pin QFP

4.2.2.3 Block Diagram (KS32C6100 Block Diagram)


CNTR
DATA
ADDR
Address Decoder
DMA
Parallel Port Interface
UART/ Serial I/O
Timers
I/O Port Controller
Bus Router
CPU (ARM7TDMI)
LBUS
I/D Cache (4-KB)
Interrupt controller
Image Functional Block
Graphic Engine Unit
Printer Interface Controller
SYSTEM MANAGER
System Bus Controller
Bus Arbitration
Bus Interface
ROM/SRAM/DRAM Controller

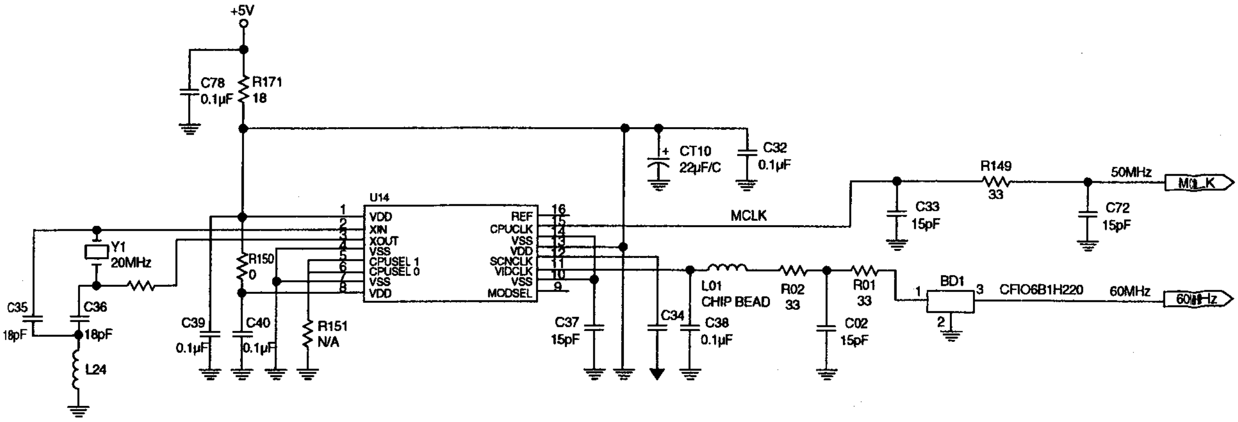
4.2.2.4 KS32C6100 PIN NAMES


KS32C6100
208
(Top View)
156
157
105
104
208
53
1
52
GNDcore
COMCLK
GNDpad
CnPBSY
CnPMSG
CnEBSY
CnEMSG
VCLK0
VCLK1
nENGPRQ
VDDpad
VDDcore
nENGHSYNC
nCPUPBSYNC
nENGREADY
nCPUPRINT
VIDEO OUT
GNDpad
GPIO00
GPIO01
GPIO02
GPIO03
GPIO04
GPIO05
GPIO06
GPIO07
VDDpad
VDDpad
GPIO08
GPIO09
GPIO10
GPIO11
GPIO12
GPIO13
GPIO14
GPIO15
GNDcore
nRSTO
nRESET
TnRST
TMODE
nBKOHW
VDDcore
VDDpad
CLKSEL
TDI
TDO
TMS
GNDpad
MCLK
GNDpad
TCK
GNDpad
GNDcore
XD24
XD23
XD22
XD21
XD20
XD19
XD18
VDDpad
XD17
XD16
XD15
XD14
XD13
XD12
GNDpad
XD11
XD10
XD09
XD08
XD07
XD06
XD05
VDDcore
XD04
XD03
XD02
XD01
XD00
nRCS3
nRCS2
nRCS1
GNDcore
GNDpad
nRCS0
XA23
XA22
XA21
XA20
XA19
XA18
VDDcore
VDDpad
XA17
XA16
XA15
XA14
XA13
XA12
XA11
GNDpad

4.2.3 CLOCK GENERATOR

A 20 MHz crystal is used to drive the U14 (clock generator). The clock generator supplies clock speeds of 40 MHz, 50 MHz and 60 MHz to drive the CPU and ASIC image chip.

CLOCK GENERATOR


+5V
C78
0.1µF
R171
18
CT10
22µF/C
C32
0.1µF
R149
33
50MHz
MCLK
C33
15pF
C72
15pF
MCLK
U14
VDD
XIN
XOUT
VSS
CPUSEL 1
CPUSEL 0
VSS
VDD
REF
CPUCLK
VSS
VDD
SCNCLK
VIDCLK
VSS
MODSEL
1
2
3
4
5
6
7
8
16
15
14
13
12
11
10
9
Y1
20MHz
R150
0
C35
18pF
C36
18pF
L24
C39
0.1µF
C40
0.1µF
R151
N/A
C37
15pF
C34
L01
CHIP BEAD
C38
0.1µF
R02
33
R01
33
C02
15pF
BD1
1
2
3
CFIO6B1H220
60MHz
60MHz

4.2.4 DRAM

DRAM are used for the basic memory for a capacity of 2 MB.
The scanned data is stored when the data input at the parallel port is copied or scanned.

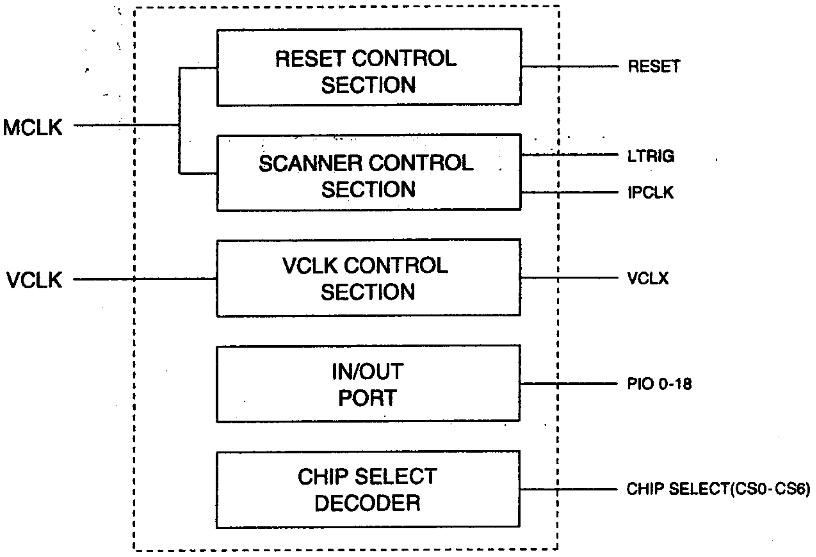
4.2.5 FLASH MEMORY

Flash memory are used, with built-in programs to drive the GDI drive and combined unit.

4.2.6 ASIC (MJM3000)

4.2.6.1 ASIC FUNCTION BLOCK DIAGRAM

Mainly for convenient scanner control, system control and printer control, MJM3000 puts these functions under direct IC control, and basic functions are divided into the reset control section, scanner control section, printer engine clock generation section and general I/O port section.


RESET CONTROL SECTION
SCANNER CONTROL SECTION
VCLK CONTROL SECTION
IN/OUT PORT
CHIP SELECT DECODER
MCLK
VCLK
RESET
LTRIG
IPCLK
VCLX
PIO 0-18
CHIP SELECT(CS0-CS6)

4.2.6.2 RESET CONTROL SECTION

Reset functions can be divided into POWER ON RESET, S/W RESET and WATCHDOG RESET, etc. These are processed by the reset control section.

4.2.6.3 SCANNER CONTROL

This generates the LTRIG signal, which is the line synchronization signal, and IPCLK, which is the clock for the image processing IC.

4.2.6.4 VCLK CONTROL

This is comprised of the frequency divider which creates the input master clock using the necessary VCLK, the duty control which controls the clock duty, and the section which controls the phase of VCLK.

4.2.6.5 GENERAL I/O PORTS

PIO0 - PIO18 can be used, with control of the input and output of each port possible.

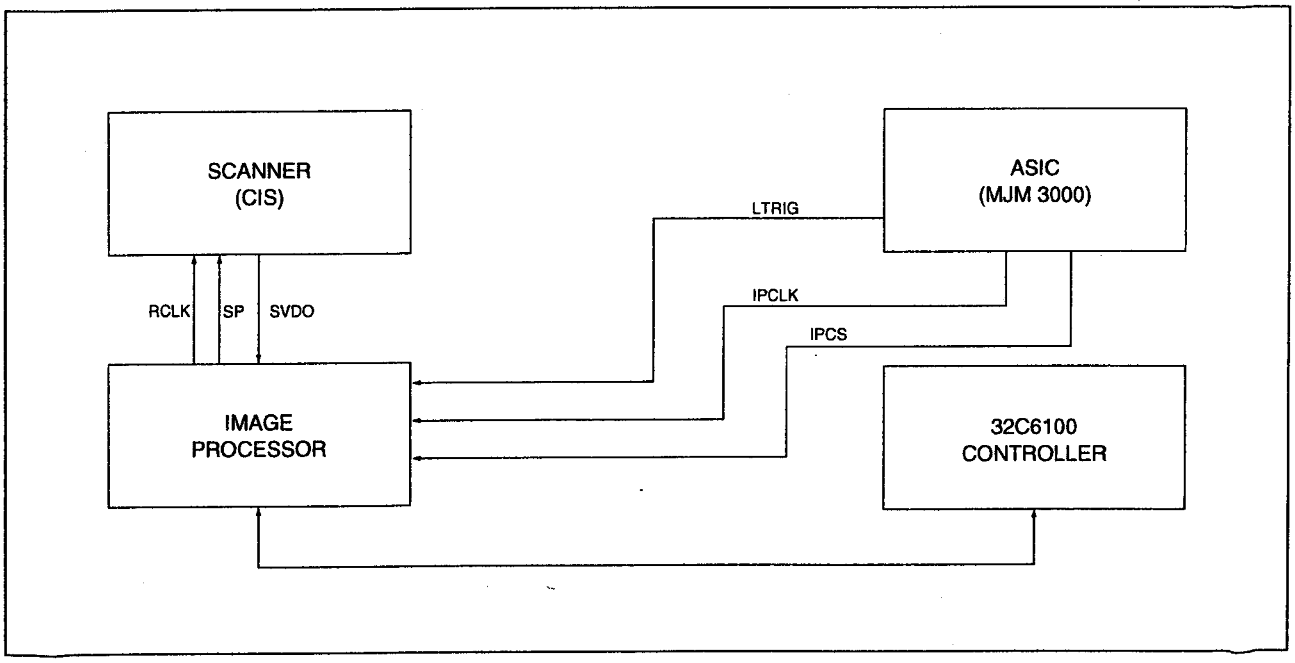
4.2.6.6 CHIP DECODER

This generates the chip selection signals for selecting the external IC to be used. A maximum of seven can be selected.

4.2.7 IMAGE PROCESSING SECTION

4.2.7.1 IMAGE PROCESSING BLOCK DIAGRAM

Image processing involves operating the scanner via ASIC under the control of the controller, the image processor performs image processing of the analog video signals generated by the scanner, and the images are read at the processor via DMA.



4.2.7.2 IMAGE PROCESSOR

The image processor is comprised of 1 device, the AK8414 for A/D conversion which converts analog signals into digital signals, and converts the digital data for each image mode.

- Main functions of AK8414:
  - Black & white shading
  - Correction
  - Automatic gain control
  - A/D conversion
  - Alphabet/diagram discrimination function
  - Edge emphasis function
  - Enlargement/reduction function

4.2.7.3 CIS

This device uses the line synchronization signal and shift clock to convert the reflected light from the document into an electrical signal with a resolution of 200 DPI.

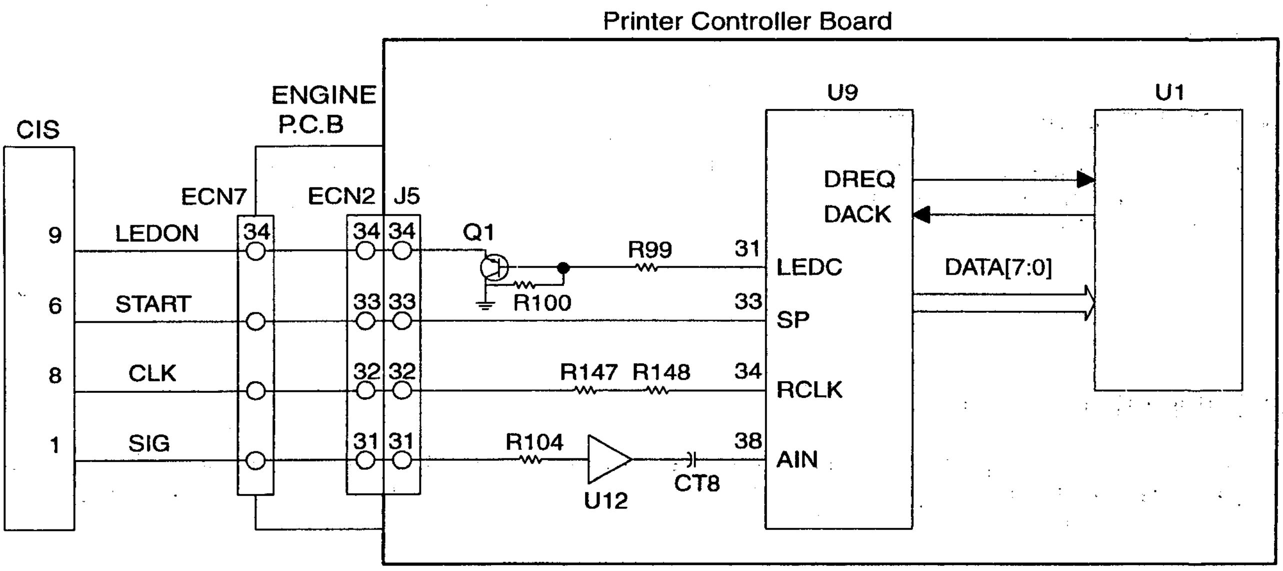
4.2.7.4 IMAGE PROCESSING

When the document is detected by the document detection sensor, first the black reference data and white reference data are read before the document is read, and this data is stored in the shading RAM for AK8414 to perform compensation when the actual document is read.
After the reference data has been read, the document is transferred to the scanner (CIS) reading position and then the actual document is read.
Document transfer is actually controlled by the engine controller, and scan line discrimination is performed by the start pulse (SP). In other words, after the SP is generated, sampling is performed by AK8414 which is generating analog signals in bit units at CIS by the shift clock, then after compensation of the originally set black/white values, the data is converted into 256 level digital signals (8 bit data).

4.2.7.5 SCANNING SECTION

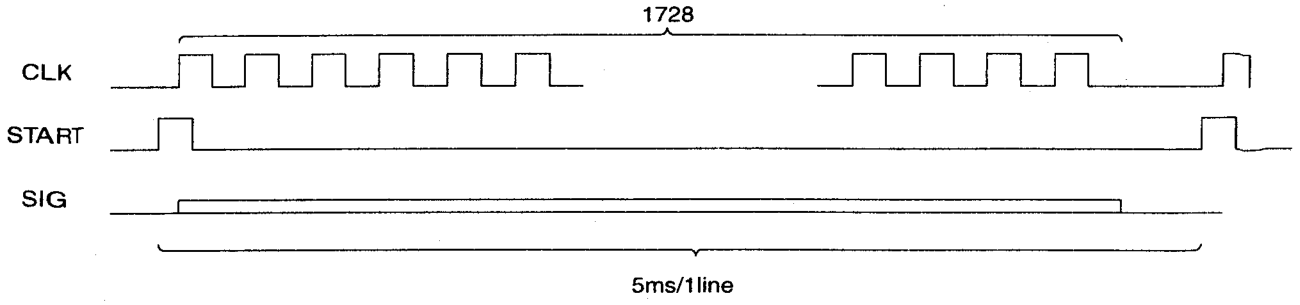
The scanning block of this device consists of a control circuit, a contact image sensor made up of a lens array,an LED array,and photoelectric conversion elements.

Circuit Diagram


Printer Controller Board
ENGINE P.C.B
CIS
ECN7
ECN2
J5
U9
U1
9 LEDON
6 START
8 CLK
1 SIG
34
33
32
31
Q1
R99
R100
R147 R148
R104
U12
CT8
31 LEDC
33 SP
34 RCLK
38 AIN
DREQ
DACK
DATA[7:0]

When an original document is inserted and the start button pressed,pin31 of U9 goes to a high level and the transistor Q1 turns on.This applies voltage to the LED array to light it.The contact image sensor is driven by each of SP-RCLK signals output from U9,and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal(SVDO).The analog image signal is input to pin38 of U9 and converted into 8-bit data by the A/D converter inside U9.Then this signal undergoes digital processing in order to obtain a high-quality image.

Timing Chart


1728
CLK
START
SIG
5ms/1line

5. ENGINE CONTROLLER SECTION

The ENGINE CONTROLLER BOARD consists of the MICRO-COMPUTER (U5) and the circuits as shown below.

① Fixer temperature control
② Solenoid control
③ Motor control
④ FAN Motor control
⑤ LSU control

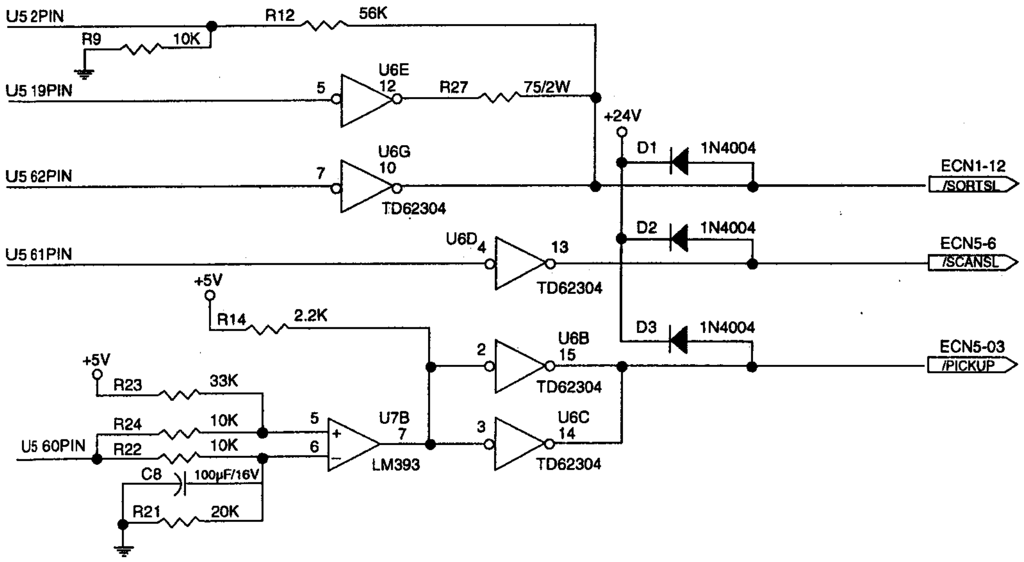
5.1 FIXER TEMPERATURE CONTROL CIRCUIT

The fixer temperature control circuit has a thermistor in contact with the heater roller inside the fixer to detect the surface temperature of the heater roller, and it turns the fixer ON/OFF.
In details, see the POWER SUPPLY BOARD SECTION.

5.2 SOLENOID DRIVE CIRCUIT

The solenoid drive circuit controls the pick-up clutch, scanner section clutch and the dual sorting tray. The solenoid is designed to be driven by +24 V, driven by pins 60, 61 and 62 of the CPU. Diodes D1, D2 and D3 (1N4004) protect U6 from backward voltage when the solenoid is driven.

Solenoid Drive Circuit



U5 2PIN
R12
56K
R9
10K
U5 19PIN
5
U6E
12
R27
75/2W
+24V
U5 62PIN
7
U6G
10
TD62304
D1
1N4004
ECN1-12
/SORTSL
U5 61PIN
U6D
4
13
TD62304
D2
1N4004
ECN5-6
/SCANSL
+5V
R14
2.2K
D3
1N4004
ECN5-03
/PICKUP
2
U6B
15
TD62304
+5V
R23
33K
R24
10K
5
U7B
7
U5 60PIN
R22
10K
6
LM393
3
U6C
14
TD62304
C8
100µF/16V
R21
20K

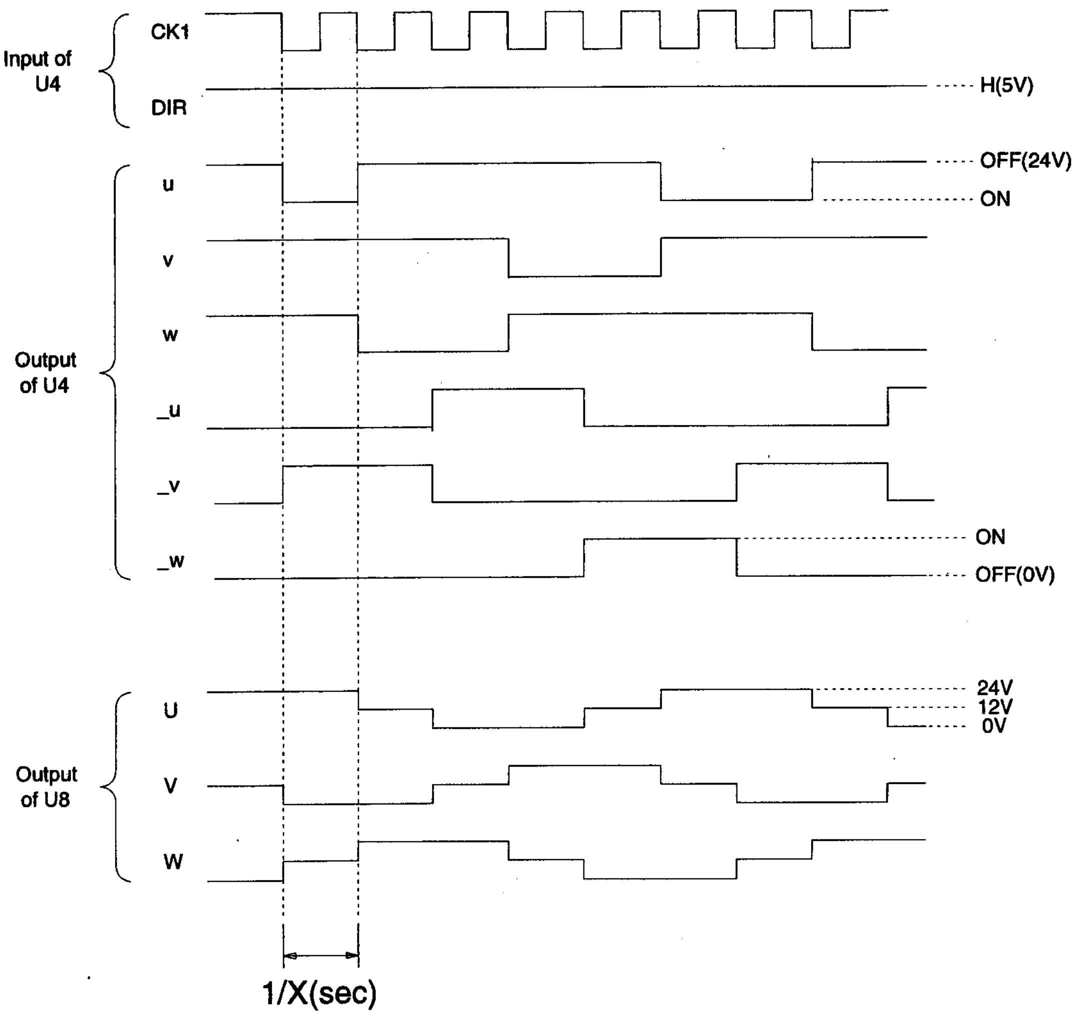
5.3 STEPPING MOTOR DRIVE CIRCUIT

1) Function
This motor functions for main operations including FAX transmission, FAX reception, copy and PC printing.

2) Motor operation
Pulse emitting clock is output from U5-39 pin. Then, stepping pulse is output from U4-15, 16, 18, 19, 21, 22 pins and drives the motor coil.

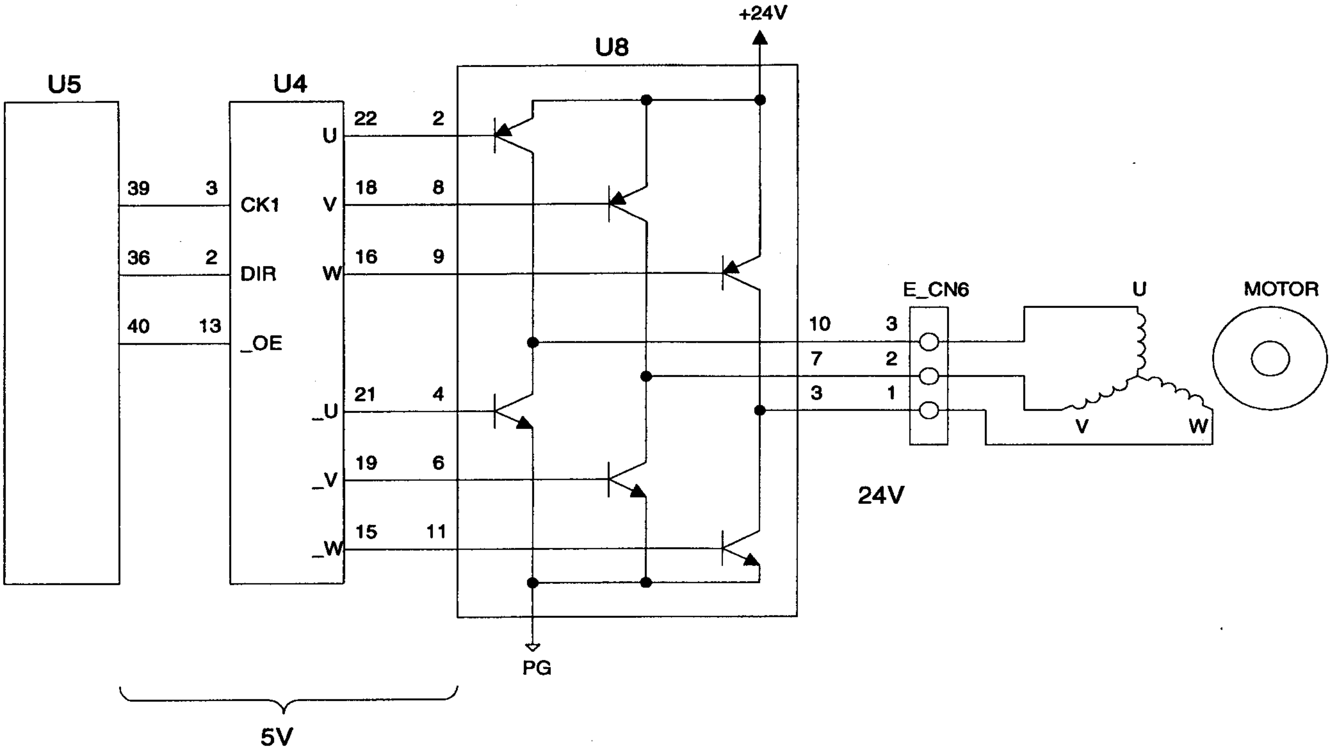
The timing chart is below. (Worm-Up, Print Mode)

Timing chart



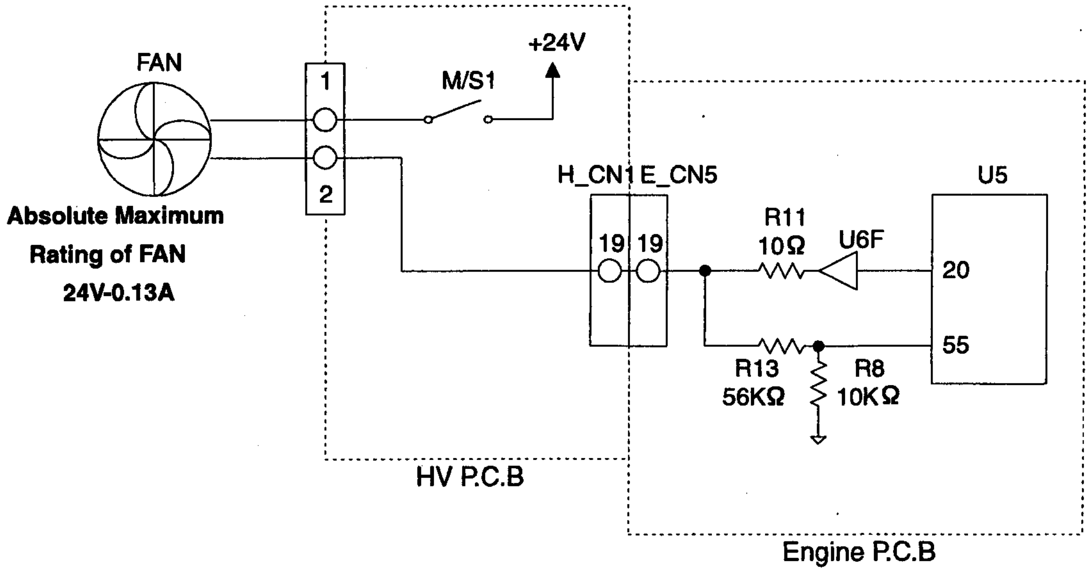
Function	Mode	Speed:X	CK2/DIR
Fax	Standard	1600pps	L
	Fine/Half tone	800pps	L
	Super Fine	400pps	L
Print/Worm-up	-	1091pps	H

Circuit Diagram (Engin P.C.B)


+24V
U8
U5
U4
22
2
U
39
3
CK1
18
8
V
36
2
DIR
16
9
W
E_CN6
U
MOTOR
40
13
_OE
10
3
7
2
3
1
21
4
_U
V
W
19
6
_V
24V
15
11
_W
PG
5V

5.4 FAN MOTOR DRIVE CIRCUIT

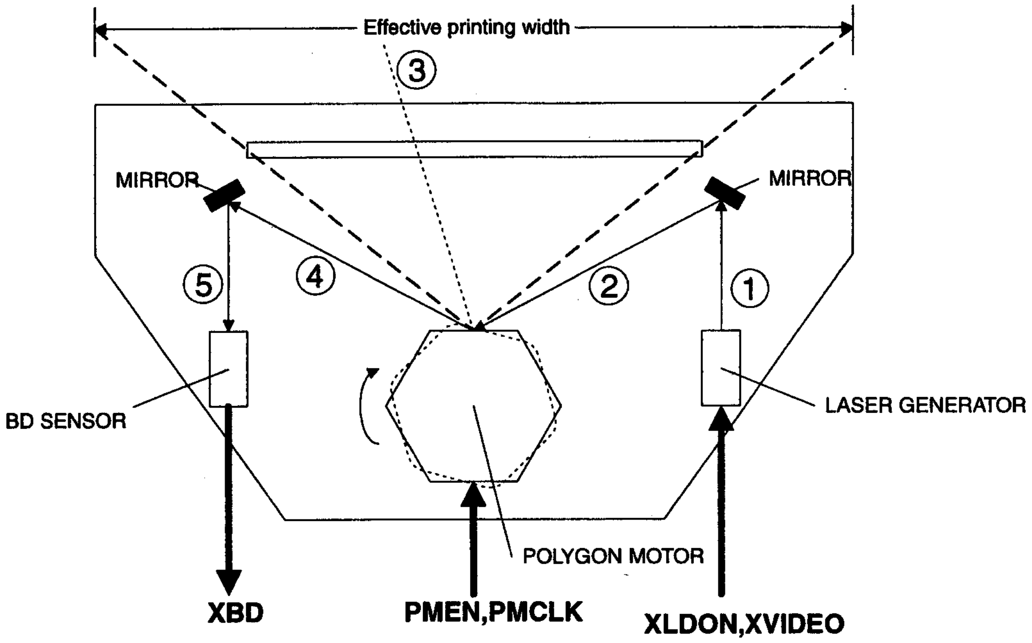
This FAN is used to radiate heat in the unit.
When the printer cover is open, M/S1 turns OFF and +24V is shut off so that the FAN does not work.
When the printer cover is closed and pin 55 of U5 becomes low level, the FUN rotates.
The signal level at U5-pin 55 becomes low, the FAN is activated.
In this case, the signal level at pin 55 of U5 becomes high and the rotation of the FAN is detected.


FAN
Absolute Maximum
Rating of FAN
24V-0.13A
1
2
M/S1
+24V
H_CN1
E_CN5
19
19
R11
10Ω
U6F
U5
20
55
R13
56KΩ
R8
10KΩ
HV P.C.B
Engine P.C.B

Mode	U5-20pin	U5-55pin
FAN open check(OK)	high level	3.5V
FAN open check(NG)	high level	0V
Normal	low level	about 0.2V

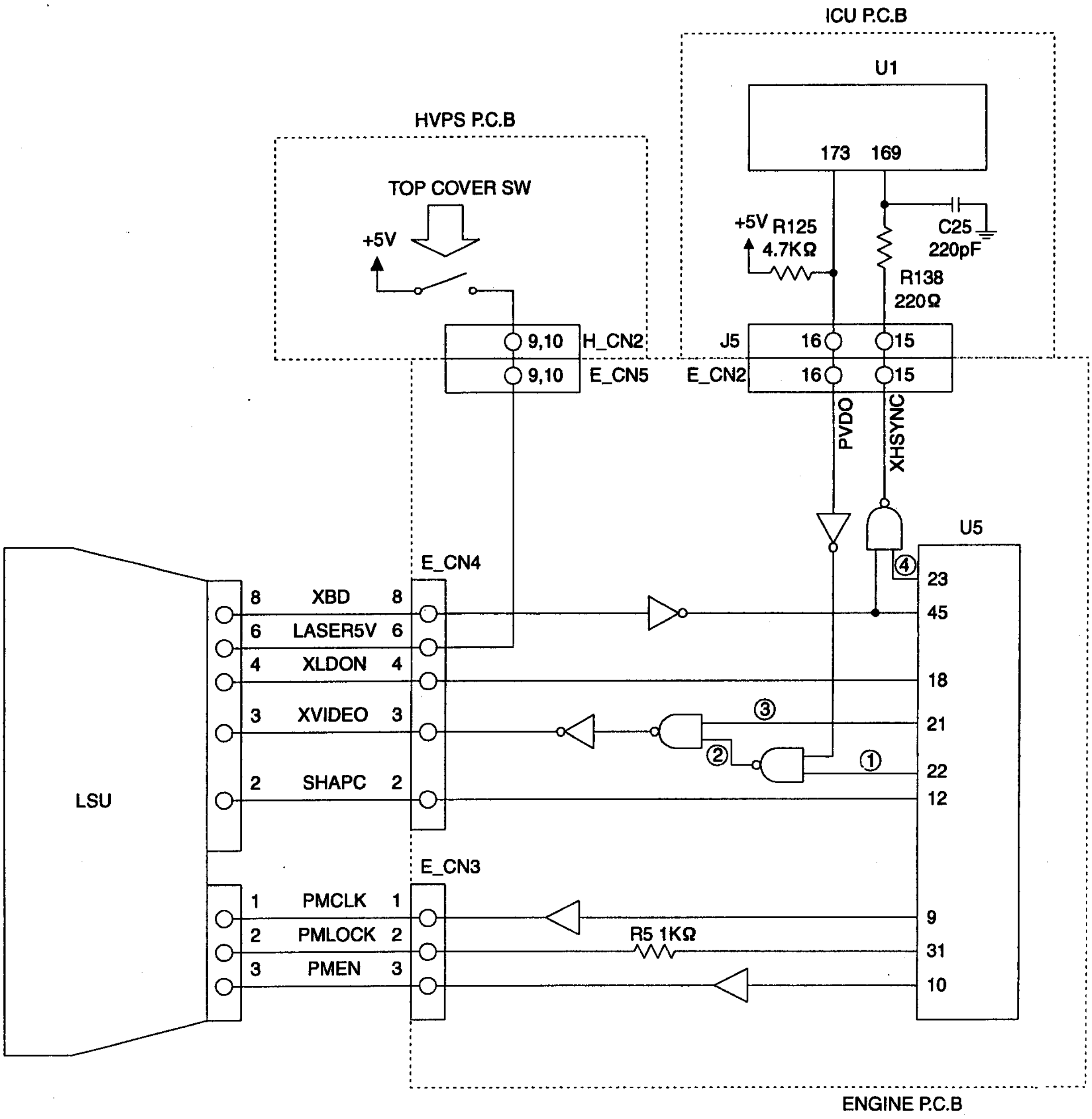
5.5 LSU (Lasen Scom Unit) CONTROL CIRCUIT

LSU forms the image on the drum by rotating polygon motor andreflecting the laser beam against polygon mirror. Structure inside is shown below.


Effective printing width
③
MIRROR
MIRROR
⑤
④
②
①
BD SENSOR
LASER GENERATOR
POLYGON MOTOR
XBD
PMEN,PMCLK
XLDON,XVIDEO

①Laser output
②Laser reflected by mirror
③Laser reflecting on the drum
④Laser towards the effective printing outside range
⑤Laser reflected by mirror and reflecting onto the sensor

Circuit Diagram

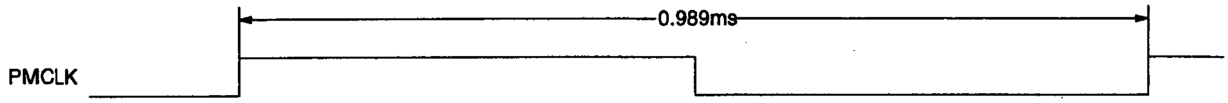

ICU P.C.B
U1
173
169
+5V
R125
4.7KΩ
C25
220pF
R138
220Ω
J5
16
15
HVPS P.C.B
TOP COVER SW
+5V
9,10
H_CN2
9,10
E_CN5
E_CN2
16
15
PVDO
XHSYNC
U5
E_CN4
23
45
18
21
22
12
9
31
10
8 XBD 8
6 LASER5V 6
4 XLDON 4
3 XVIDEO 3
2 SHAPC 2
LSU
E_CN3
1 PMCLK 1
2 PMLOCK 2
3 PMEN 3
R5 1KΩ
①
②
③
④
ENGINE P.C.B

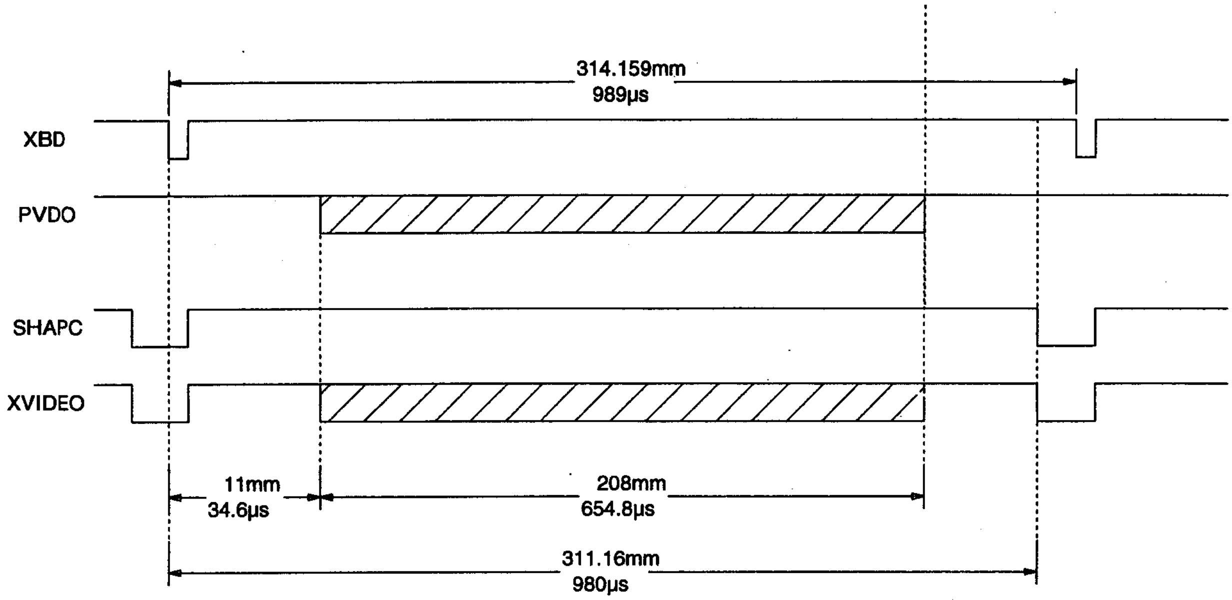
Each signal level during printing

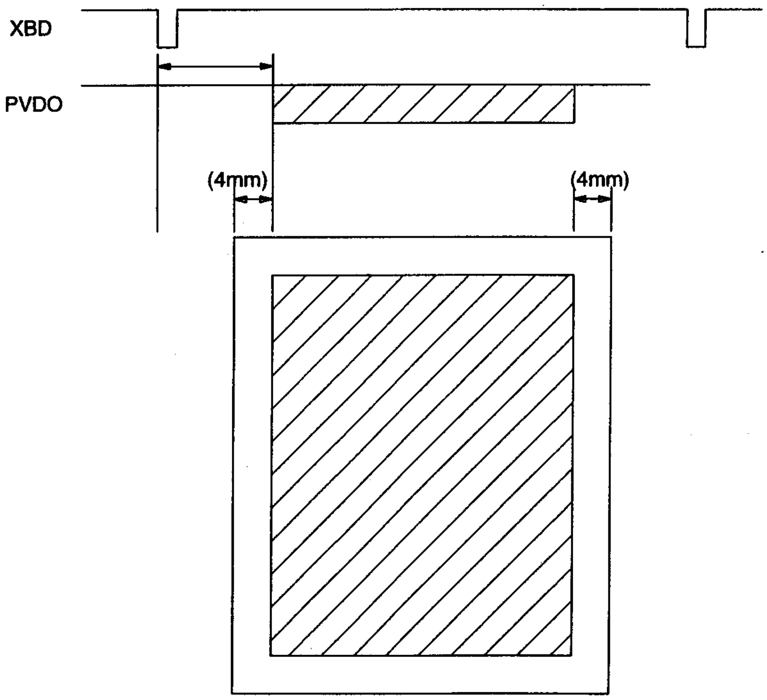
If you have any trouble, check each signal and make sure output/input are as follows.

①: 'H'
②: =PVDO
③: 'H'
④: 'H'
PMEN : 'L'
PMLOCK : 'L'
LASER5V : 'H'
LDON : 'L'
PMCLK,XBD,XVIDEO,SHAPC : Refer to timing chart

Timing Chart (PC print)


0.989ms
PMCLK


314.159mm
989µs
XBD
PVDO
SHAPC
XVIDEO
11mm
34.6µs
208mm
654.8µs
311.16mm
980µs


XBD
PVDO
(4mm)
(4mm)

6. SENSORS AND SWITCHES SECTION

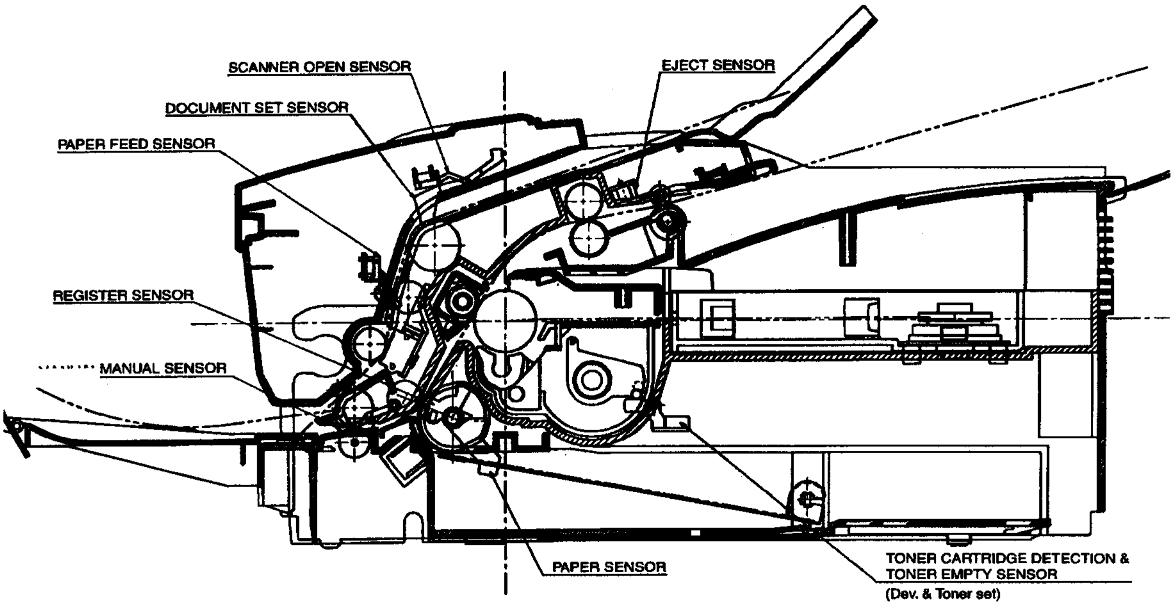
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error	Page
Operation Panel	PI301	Document Set	[CHECK DOCUMENT]	230
Engin Controller PCB	PI	Dev & Toner Set	[CHECK TONER] [TONER LOW]	235
High Voltage PCB	SW	Printer Cover Open	[TOP COVER OPEN]	232
Sensor PCB	SW	Laser Power	————	
	SW	OPC Set	[CHANGE DRUM] [CHECK DRUM]	234
Sensor PCB	PI	Register	[FAILED PICKUP]	233
Sensor PCB	PI	Paper	[OUT OF PAPER]	232
Sensor PCB	SW	Manual	————	233
Sensor PCB	SW	Exit	[PAPER JAMMED]	233
Sensor PCB	SW	Paper Feed	[REMOVE DOCUMENT]	230
Sensor PCB	SW	Scanner Cover Open	[PANEL OPEN]	231
Sensor PCB	SW401	Hook Switch	————	231

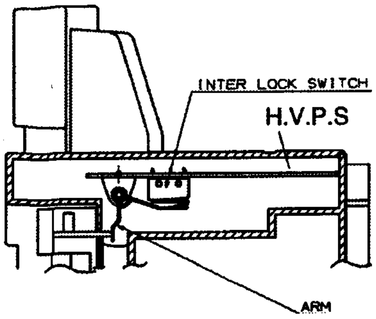
Note:

See TEST FUNCTIONS - SENSOR CHECK SECTION for the sensor test.
(#815 of Service Mode test. Refer to TEST FUNCTIONS.) (see page 131)

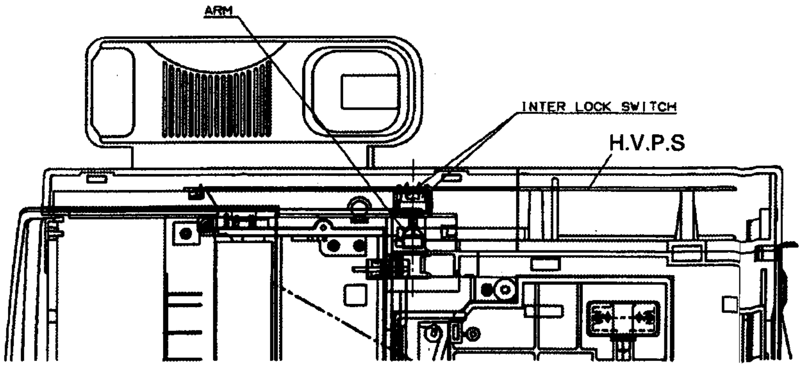
SENSORS AND SWITCHES LOCATION


SCANNER OPEN SENSOR
EJECT SENSOR
DOCUMENT SET SENSOR
PAPER FEED SENSOR
REGISTER SENSOR
MANUAL SENSOR
PAPER SENSOR
TONER CARTRIDGE DETECTION &
TONER EMPTY SENSOR
(Dev. & Toner set)

(side View)


INTER LOCK SWITCH
H.V.P.S
ARM

(Top View)

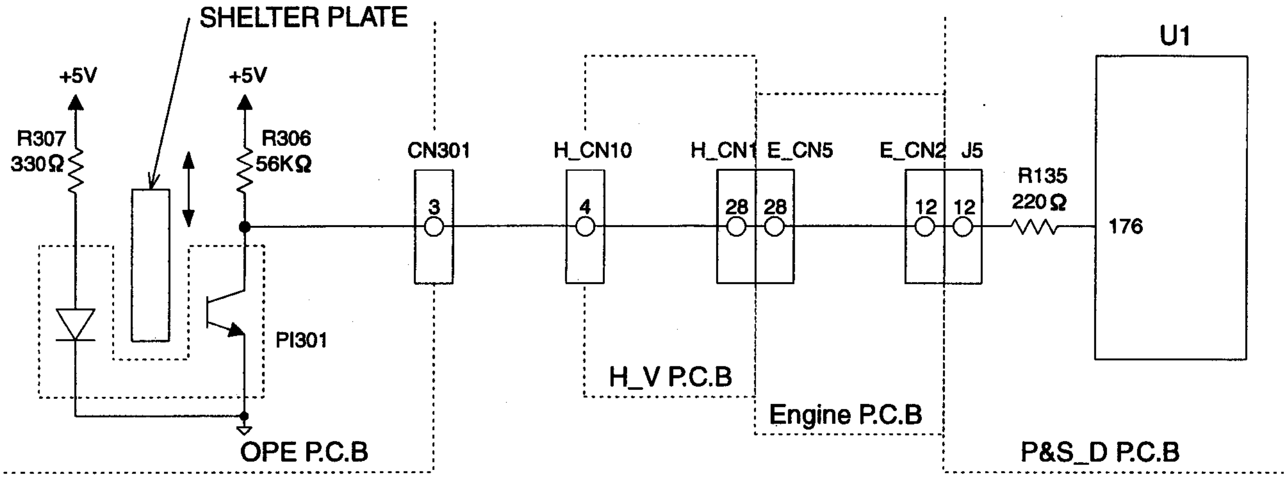

ARM
INTER LOCK SWITCH
H.V.P.S

6.1. DOCUMENT SENSOR (PI301)

The Sensor detects whether or not a document is set in place.

When a document is detected, the shelter plate is lifted so that the sensor light can pass through, thephototransistor turns ON, and the input signal of U1-176pin (Printer & Scanner Driver P.C.B) becomesa low level.

When there is no document, the shelter plate shuts off / cut off the sensor light, the phototransistor turns OFF, and the input signal of U1-176pin (Printer & Scanner Driver P.C.B) becomes a high level.


SHELTER PLATE
+5V
+5V
R307
330Ω
R306
56KΩ
PI301
OPE P.C.B
CN301
3
H_CN10
4
H_V P.C.B
H_CN1
28
E_CN5
28
Engine P.C.B
E_CN2
12
J5
12
R135
220Ω
176
U1
P&S_D P.C.B

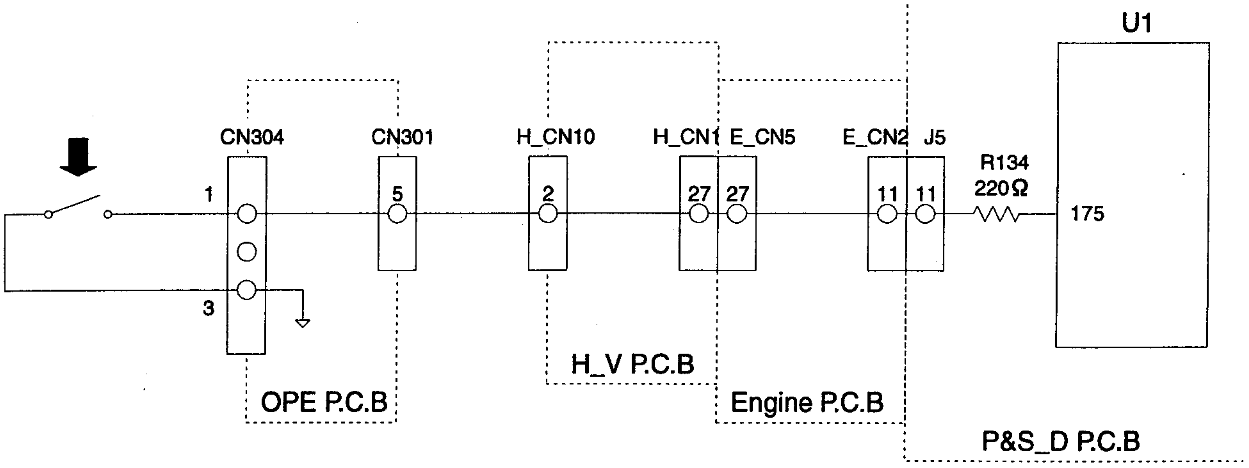
	Phototransistor	Signal(U1-176pin)
No Document	OFF	High level
Document Set	ON	Low level

6.2. PAPER FEED SENSOR

The Sensor detects the leading edge of the document.

When a document is brought to the read position, the switch turns ON, and the input signal of U1-175pin (Printer & Scanner Driver P.C.B) becomes a low level.

When there is no document at the read position, the switch turns OFF, and the input signal of U1-175pin (Printer & Scanner Driver P.C.B) becomes a high level.


CN304
1
3
OPE P.C.B
CN301
5
H_CN10
2
H_V P.C.B
H_CN1
27
E_CN5
27
Engine P.C.B
E_CN2
11
J5
11
R134
220Ω
175
U1
P&S_D P.C.B

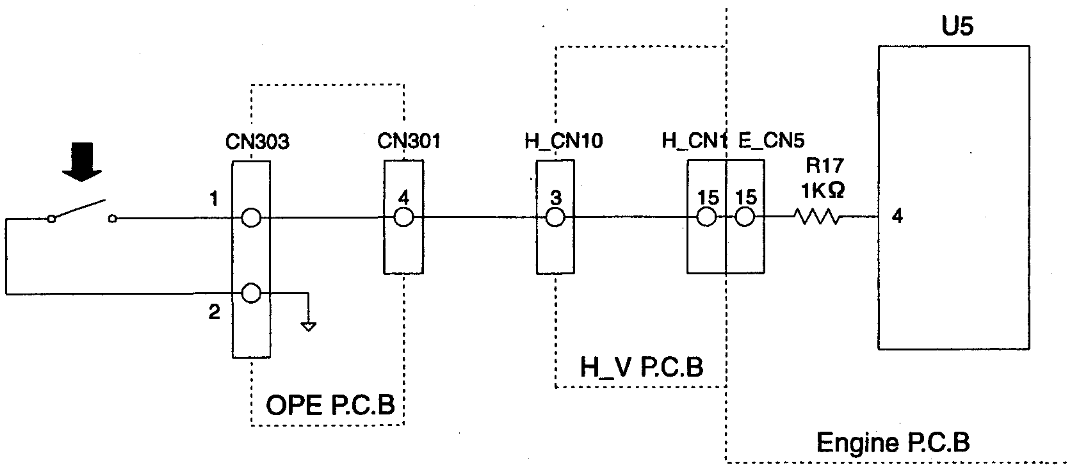
	Switch	Signal(U1-175pin)
Non Read Position	OFF	High level
Read Positon	ON	Low level

6.3. SCANNER COVER OPEN SENSOR (C_SW)

The Switch detects whether the printer cover is open or closed.

When the printer cover is closed, the switch turns ON, and the input signal of U5-4pin (Engin P.C.B) becomes a low level.

When the printer cover is open, the switch turns OFF, and the input signal of U5-4pin (Engin P.C.B) becomes a high level.

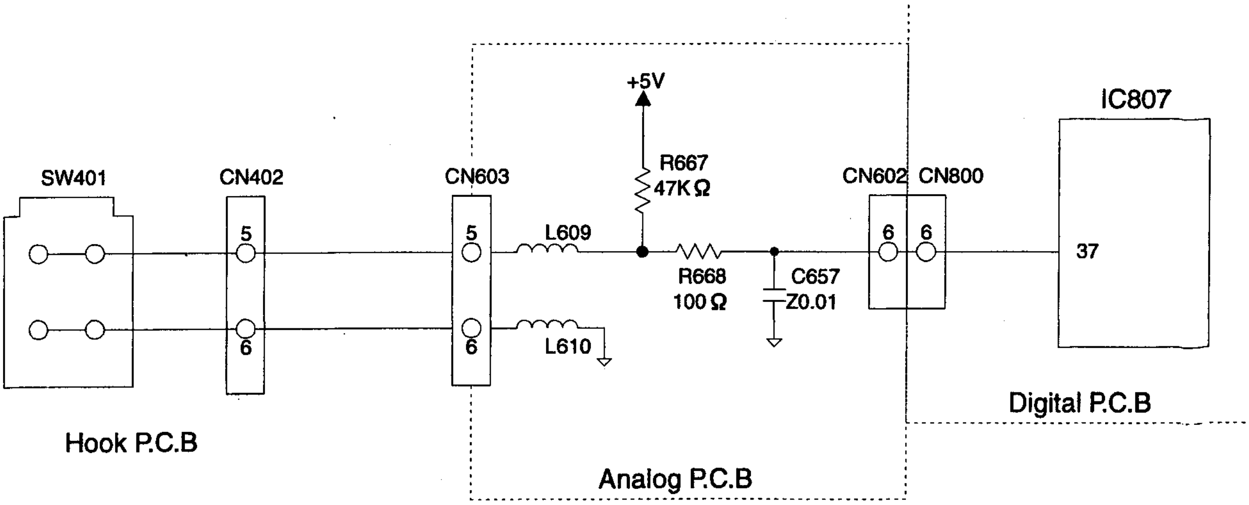

U5
CN303
CN301
H_CN10
H_CN1
E_CN5
R17
1KΩ
1
2
4
3
15
15
4
H_V P.C.B
OPE P.C.B
Engine P.C.B

	Switch	Signal(U5-4pin)
Open	OFF	High level
Close	ON	Low level

6.4. HOOK SWITCH (SW401)

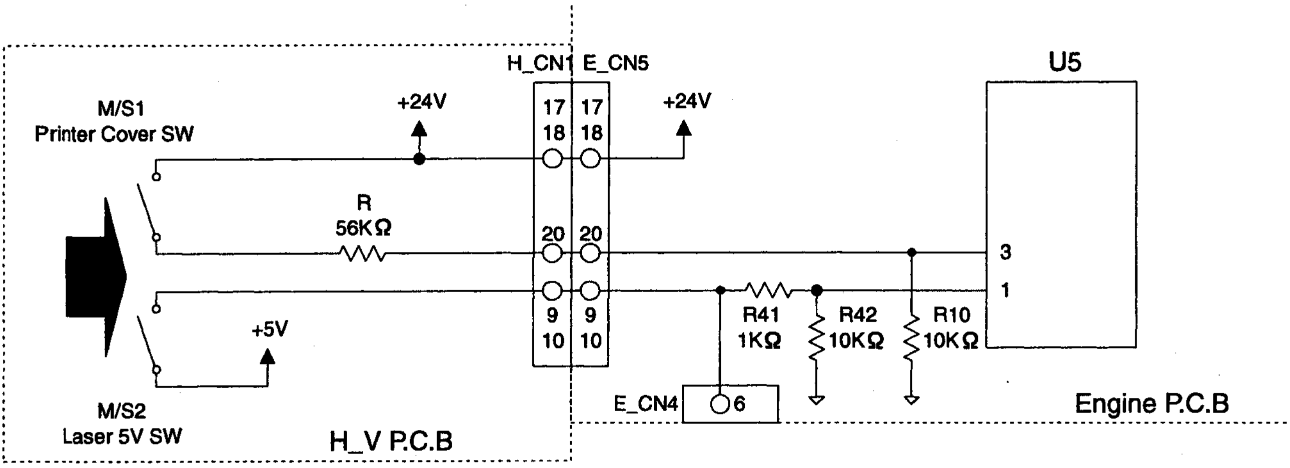
When the handset is lifted, the switch becomes ON, and the signal level at pin 37 of IC807 goes down.

When the handset is returned, the switch is becomes OFF, and the signal level at pin 37 of IC807 becomes high.


+5V
IC807
SW401
CN402
CN603
R667
47KΩ
CN602
CN800
5
5
L609
6
6
37
R668
100Ω
C657
Z0.01
6
6
L610
Digital P.C.B
Hook P.C.B
Analog P.C.B

6.5. PRINTER COVER OPEN SWITCH / LASER 5V SWITCH (M/S1,M/S2)

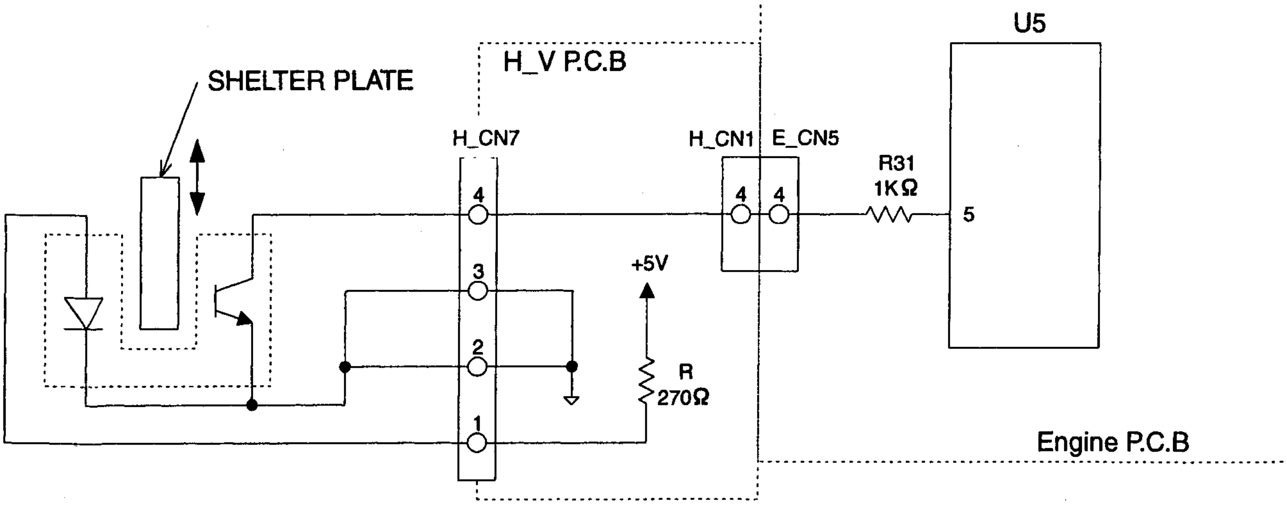
The Switches detect whether the printer cover is open or closed.
When the printer cover is closed, the switches turn OFF, and the input signal of U5-1, 3pin (EngineP.C.B) becomes a high level.
When the printer cover is open, the switches turn ON, and the input signal of U5-1, 3pin (EngineP.C.B) becomes a low level.


H_CN1
E_CN5
U5
M/S1
Printer Cover SW
+24V
+24V
17 17
18 18
R
56KΩ
20 20
3
1
9 9
10 10
+5V
R41
1KΩ
R42
10KΩ
R10
10KΩ
E_CN4
6
Engine P.C.B
M/S2
Laser 5V SW
H_V P.C.B

	Switch	Signal(U5-3pin)
Open	OFF	Low level
Close	ON	High level

6.6. PAPER SENSOR (P-SEN)

The Sensor detects whether or not the cassette and the recording paper are properly installed.
When the cassette is set the recording paper is detected,the shelter plate is lifted so that the sensor light can pass through. Then, the phototransistor turns ON, and the input signal of U5-5pin (Engine P.C.B) becomes a low level.
When there is no cassette nor recording paper, the shelter plate shuts off the sensor light, the phototransistor turns OFF, and the input signal of U5-5pin (Engine P.C.B) becomes a high level.


U5
H_V P.C.B
SHELTER PLATE
H_CN7
H_CN1
E_CN5
R31
1KΩ
4
4 4
5
3
+5V
2
R
270Ω
1
Engine P.C.B

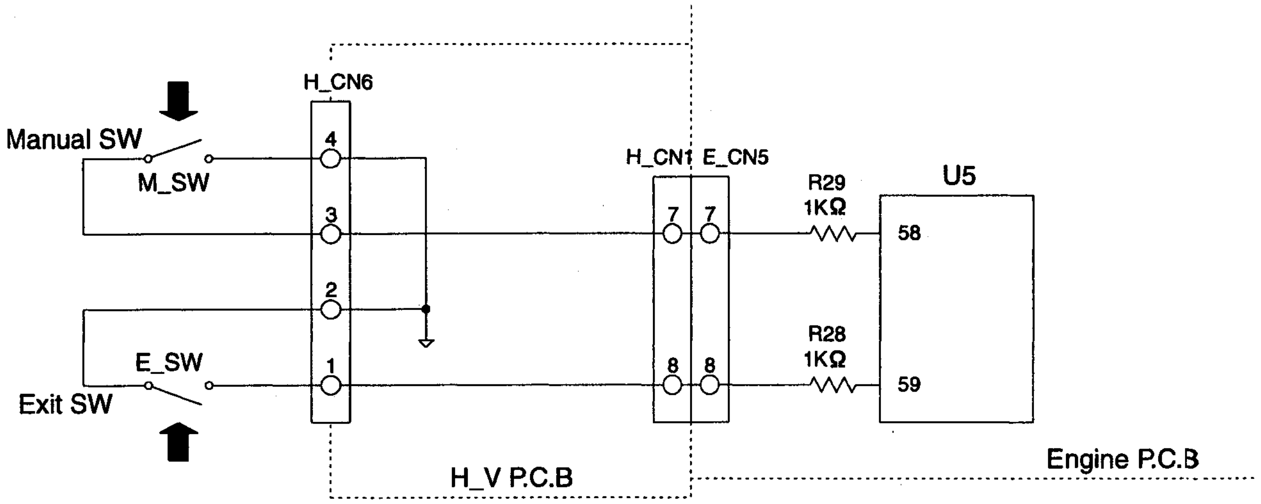
	Phototransistor	Signal(U5-5pin)
No Casette	OFF	High level
No Recording Paper	OFF	High level
Recording Paper Set	ON	Low level

6.7. MANUAL SWITCH / EXIT SWITCH(M_SW,E_SW)

The Switches detect whether the recording paper is installed or not.

When there is no recording paper,the switches turn OFF, and the input signal of U5-58, 59pin (EngineP.C.B) becomes a high level.

When there is the recording paper is properly installed, the switches turn ON, and the input signal of U5-58, 59pin (EngineP.C.B) becomes a low level.


Manual SW
M_SW
H_CN6
4
3
2
1
E_SW
Exit SW
H_CN1
E_CN5
7
7
8
8
R29
1KΩ
R28
1KΩ
U5
58
59
H_V P.C.B
Engine P.C.B

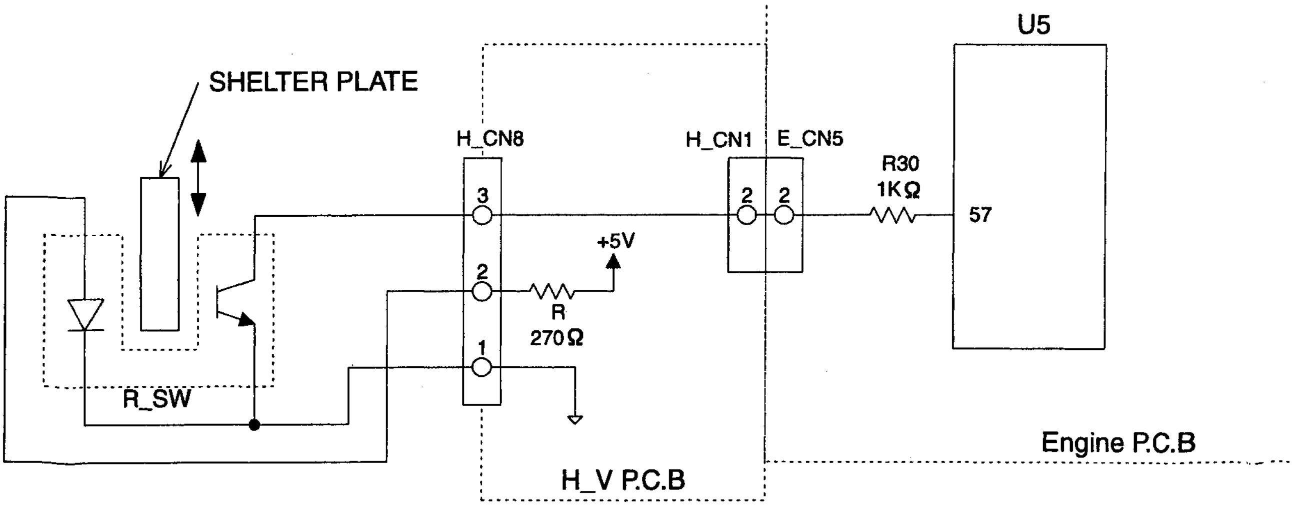
	Switch	Signal(U5-58,59pin)
No Paper	OFF	High level
Paper Exist	ON	Low level

6.8. RESISTER SENSOR (R_SEN)

The Sensor detects whether or not the recording paper is set in the paper cassette properly.

When the recording paper is detected, the shelter plate is lifted so that the seusor light can pass through 8. Then, the phototransistor turns ON, and the input signal of U5-57pin (Engine P.C.B) becomes a low level.

When there is no recording paper, the shelter plate shuts off the sensor light, the phototransistorturns OFF, and the input signal of U5-57pin (Engine P.C.B) becomes a high level.


SHELTER PLATE
R_SW
H_CN8
3
2
1
+5V
R
270Ω
H_CN1
E_CN5
2
2
R30
1KΩ
U5
57
H_V P.C.B
Engine P.C.B

	Phototransistor	Signal(U5-57pin)
No Recording Paper	OFF	High level
Recording Paper Regist	ON	Low level

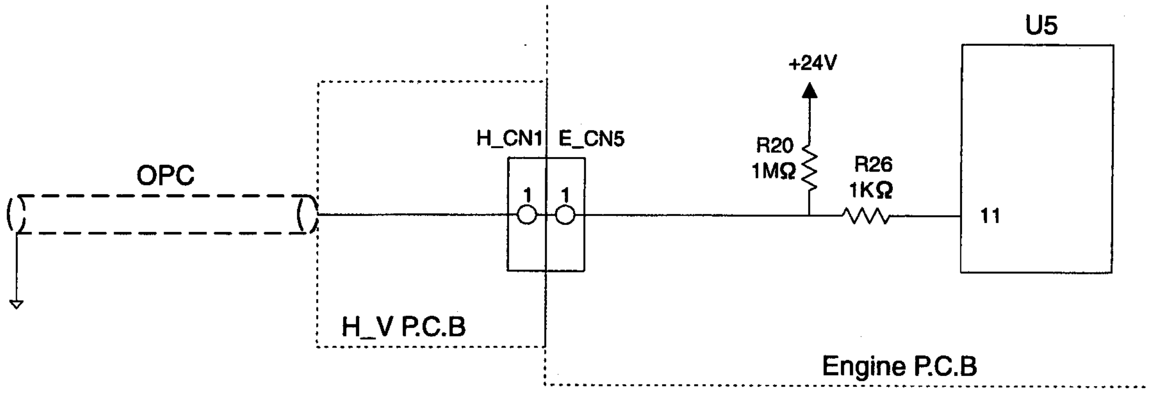
6.9. OPC SENSOR

The Switche detects whether the OPC unit is set or not.

When there is the OPC unit, the input signal of U5-11pin (Engine P.C.B) becomes a low level.

When there is no OPC unit, the input signal of U5-11pin (Engine P.C.B) becomes a high level.

Circuit Diagram

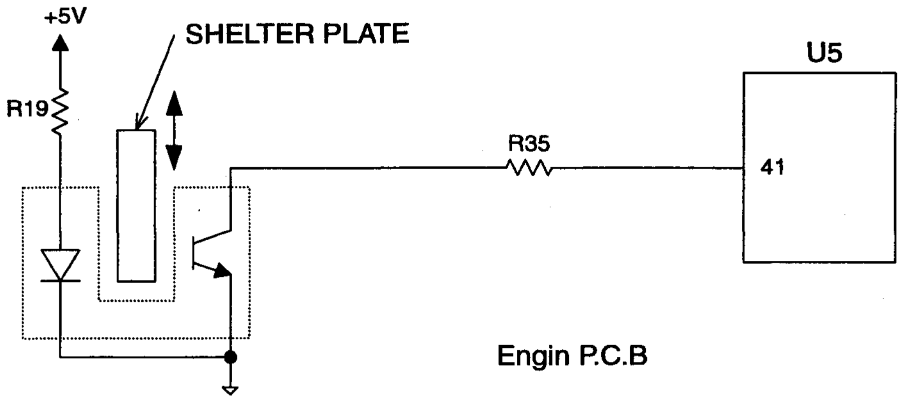

U5
+24V
H_CN1
E_CN5
R20
1MΩ
R26
1KΩ
OPC
1
1
11
H_V P.C.B
Engine P.C.B

	Signal(U5-11pin)
OPC Set	Low level
	High level

6.10. Dev. & Toner Sensor

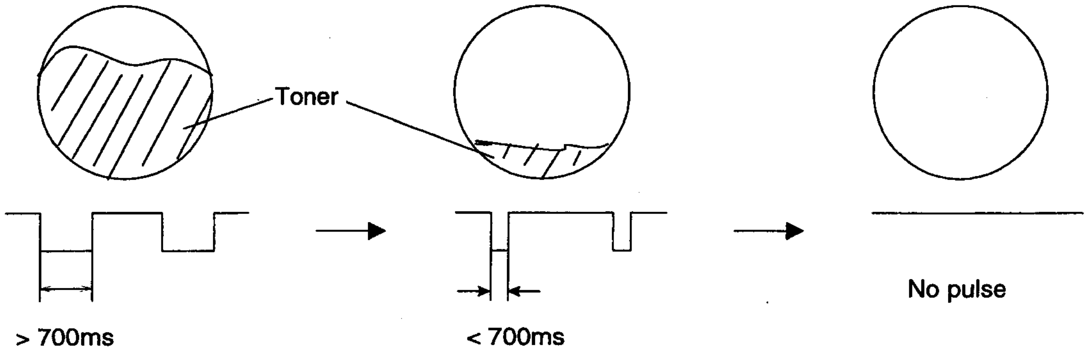
The Sensor detects whether or not the Developer unit and the toner are set in place present.
When there is not Development unit,the shelter plate is lifted so that the sensor light can pass through, the phototransistor turns ON,and the input signal of U5-41pin (Engin P.C.B) becomes a low level over 10.5s.
When the Developer unit is set,the shelter plate move with rotation of development roller,so the phototransistor turns ON/OFF.If the time of U5-41pin's high level is over 700ms, there is enough toner in Developer unit. If it is not over 700ms, toner is near empty.

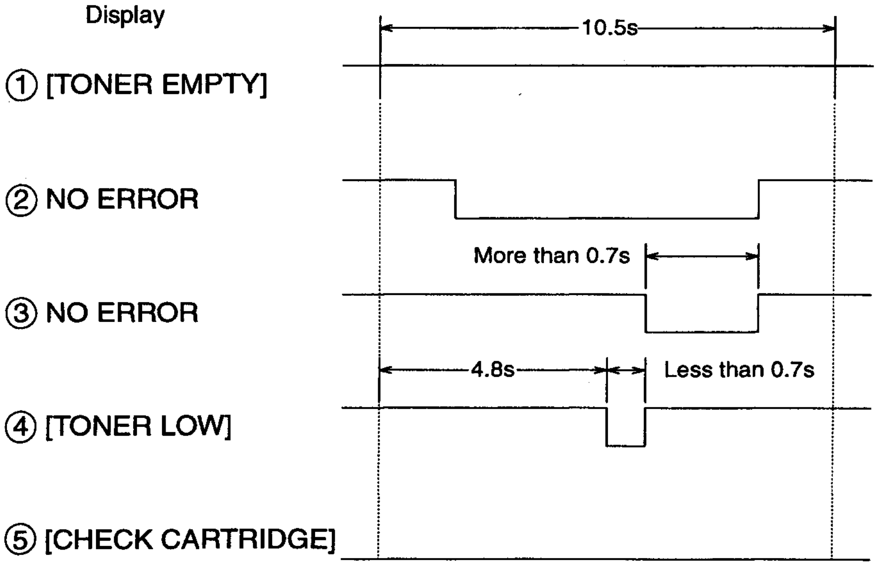
Circuit Diagram


+5V
SHELTER PLATE
R19
R35
U5
41
Engin P.C.B

	Phototransistor	Signal(U5-41pin)
No DEV Unit	ON time > 10.5s	Low level fix
Near Empty Toner	ON time < 700ms	low level < 700ms
Toner Set	ON time > 700ms	low level > 700ms

Timing chart


Toner
> 700ms
< 700ms
No pulse


Display
10.5s
① [TONER EMPTY]
② NO ERROR
More than 0.7s
③ NO ERROR
4.8s
Less than 0.7s
④ [TONER LOW]
⑤ [CHECK CARTRIDGE]

7 HVPS (High Voltage Power Supply) SECTION

7.1 HVPS SPECIFICATIONS

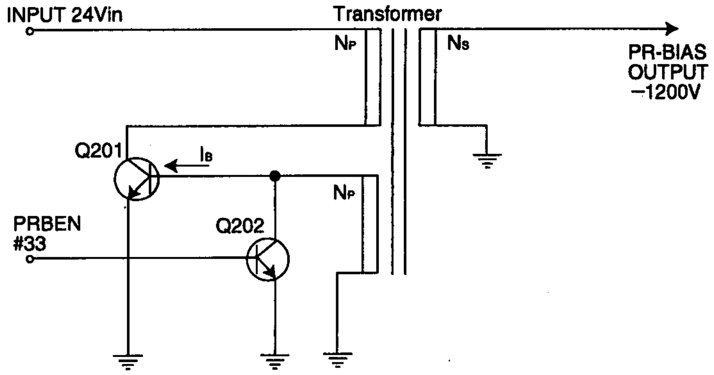
NO	Output Voltage	Item	Specification	Notes
1	Electrostatic Charge PR BIAS	Rated output voltage	-1200V±5% at 120M½	
		Variable output range	-1000~1400V	
		Output current	-10μAMax	
		Output format	Constant voltage	
2	Developing DE BIAS	Rated output voltage	-350V±5% at 60M½	
		Variable output range	-200~-400V	
		Output current	-5μAMax	
		Output format	Constant voltage	
3	Supply Roller CH BIAS	Rated output voltage	-600V±5% at 60M½	
		Variable output range	-500~-800V	
		Output current	-10μAMax	
		Output format	Constant voltage	
4	Transfer TR BIAS	Rated output current	+11μA±5% at 350M½	Output voltage varies with the surrounding environment (temperature, humidity).
		Variable output range	+7~12μA	
		Output voltage	+2000V Max	
		Output type	Constant current & constant voltage	
	RTR BIAS	Rated output voltage	-850V±5% at 120M½	
		Variable output range	-400~-800V	
		Output current	-10μAMax	
		Output type	Constant voltage	

TR BIAS is output from one of the output terminals after the TRSEL signal selects TR BIAS and RTR BIAS.

7.2 PR-BIAS (PRIMARY BIAS) UNIT

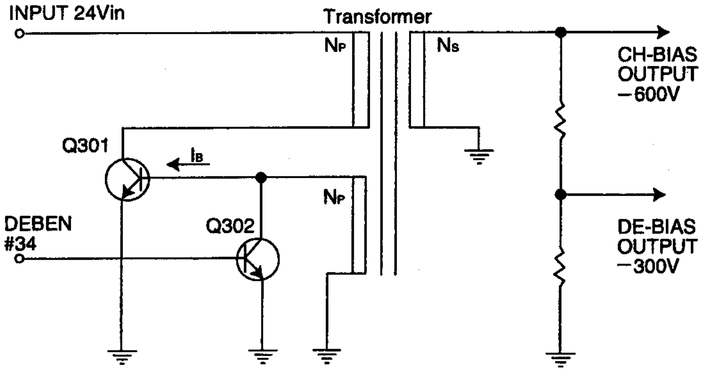
After the surface of the photosensitive drum (OPC DRUM) is cleaned, the electrostatic charge is used to adjust the electrical load on the drum surface to a uniform condition of -600 V to -650 V before the image is received. If terminal PRBEN is initially Active High, base current I8 at Q201 is detected and the electrostatic voltage is output.

Circuit Diagram


INPUT 24Vin
Transformer
NP
NS
PR-BIAS OUTPUT −1200V
Q201
IB
NP
PRBEN #33
Q202

7.3 CH-BIAS (Charge-Bias) /DE-BIAS (Developing-Bias)

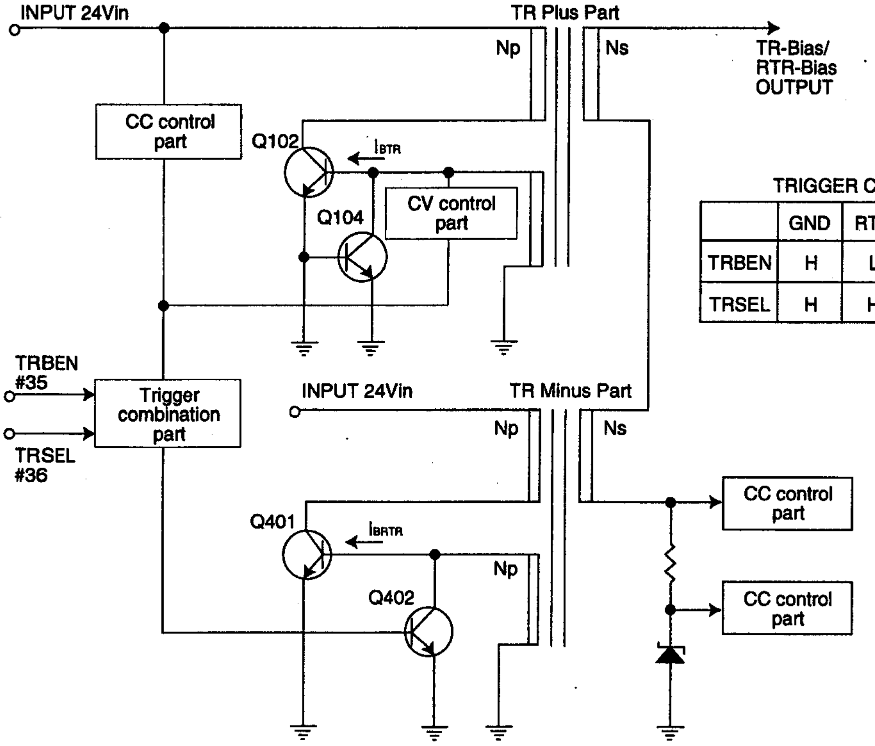
Circuit Diagram


INPUT 24Vin
Transformer
NP
NS
CH-BIAS OUTPUT −600V
Q301
IB
NP
DEBEN #34
Q302
DE-BIAS OUTPUT −300V

Toner is transferred selectively to only the electrostatic latent image section of the drum surface by the combined effect of the photosensitive drum (OPC DRUM) surface and the constant electricity, and the developing outputs DE-BIAS and CH-BIAS are used to visualize the electrostatic latent image formed at the lighting stage.
If terminal PRBEN is initially Active High, base current I8 at Q301 is bypassed by Q302, so the developing output voltage becomes OFF; if terminal PRBEN is detected to be Active Low, I8 is detected at Q301 and developing voltage is output.
At this time, the charging voltage (charge) of the toner output by the developer is a standard value of -600 V, and the developing drum charge (developing charge) has a selected shared voltage value (- 350 V) between the charge output and GND.

7.4 TR-BIAS (Transfer-Bias) RTR-BIAS (Reverse Transfer-Bias) UNIT

Circuit Diagram


INPUT 24VIn
TR Plus Part
Np
Ns
TR-Bias/
RTR-Bias
OUTPUT
CC control part
Q102
IBTR
Q104
CV control part
TRBEN
#35
Trigger combination part
TRSEL
#36
INPUT 24VIn
TR Minus Part
Np
Ns
Q401
IBRTR
Np
Q402
CC control part
CC control part

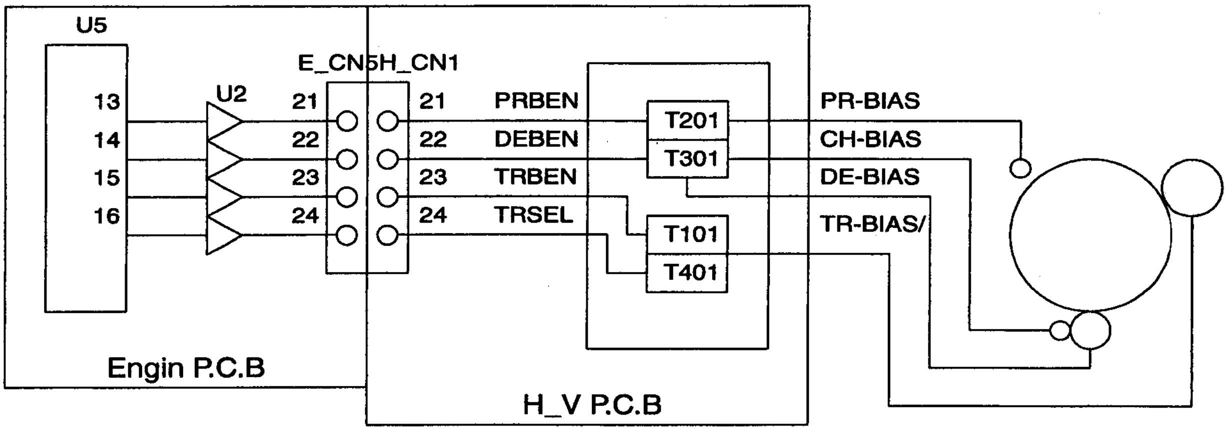
TRIGGER COMBINATION

	GND	RTR	CC TR	CV TR
TRBEN	H	L	L	H
TRSEL	H	H	L	L

The transfer voltage is comprised of the (+) output section (C/C TR-Bias: Constant Current Transfer-Bias, and C/V TR-Bias: Constant Voltage Transfer-Bias) and the (-) output section (RTR-Bias: Reverse Transfer-Bias). However, the (-) output section is used for cleaning the toner on the transfer roller, and the (+) output section is used to apply to the paper the toner image visualized on the drum surface. If terminals TRBEN and TRSEL are initially Active High, base current IBTR and IBRTR from Q401 is bypassed at GND, so all output becomes OFF. If terminal TRBEN is Low and terminal TRSEL is High, only base current IBTR at Q103 is bypassed, and reverse transfer voltage of -600 V is output. If terminal TRBEN and terminal TRSEL are Active Low, only base current IBRTR at Q401 is bypassed, and the constant current transfer (C/C TR-Bias) voltage is output. If terminal TRBEN is Active High and terminal TRSEL is Active Low, the constant voltage transfer (C/V TR-Bias) voltage is output.

H.V.P.S (High Voltage Power Supply)

Circuit Diagram


U5
13
14
15
16
U2
E_CN5
H_CN1
21
22
23
24
21
22
23
24
PRBEN
DEBEN
TRBEN
TRSEL
T201
T301
T101
T401
PR-BIAS
CH-BIAS
DE-BIAS
TR-BIAS/
Engin P.C.B
H_V P.C.B

PR-BIAS: Constant voltage; about -1180V, power on in synchronism with motor .

OH-BIAS: Constant voltage; about -600V, power on from charged section one sec. later, afterwards synchronize with the charged section.

DE-BIAS: Constant voltage; about -350V, generated by resistance partial pressure from supplied voltage.

TR-BIAS: Two kinds of transformer for + and I

Cleaning at I only, constant voltage transcription at + only.

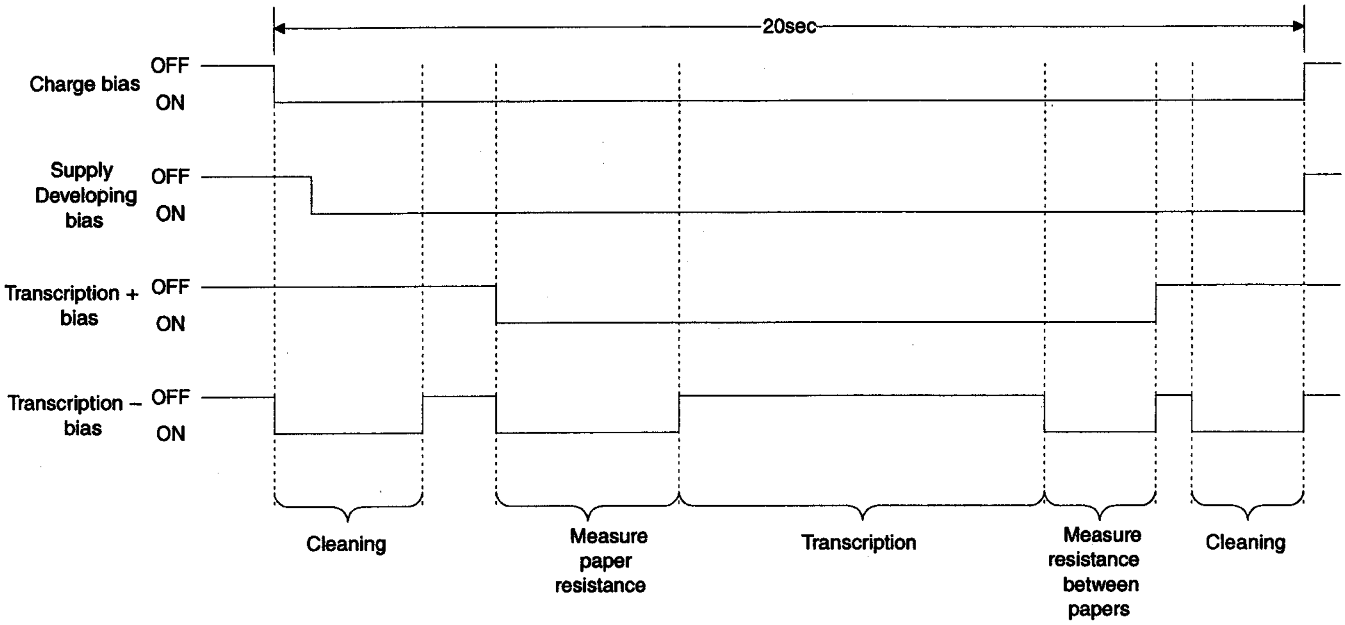
①Constant voltage; about -870V, Put toner attached to transcription roller back to OPC drum

②Constant current; about +11μA, used to determine the transcription voltage by paper resistance when the document is inserted in the transcription section.

③ + Constant voltage; When paper is inserted in the transcription section,voltage goes up by paper resistance. At this state, hold the voltage and use it for transcription. Except, for manual printing,transcription is performed at constant current mode.

		TRSEL signal	
		Low level	High level
TRBEN signal	Low level	11μA Constant Current Mode	-870V Constant Voltage Mode
	High level	+600~+2.3KV Constant Voltage Mode	OFF

Timing Chart (When Printing one sheet of paper)



(Trans Cniption - bias)

(Constant Current mode)

(Constant Voltage mode)

8. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC807: on the DIGITAL BOARD). (Fig.-a)

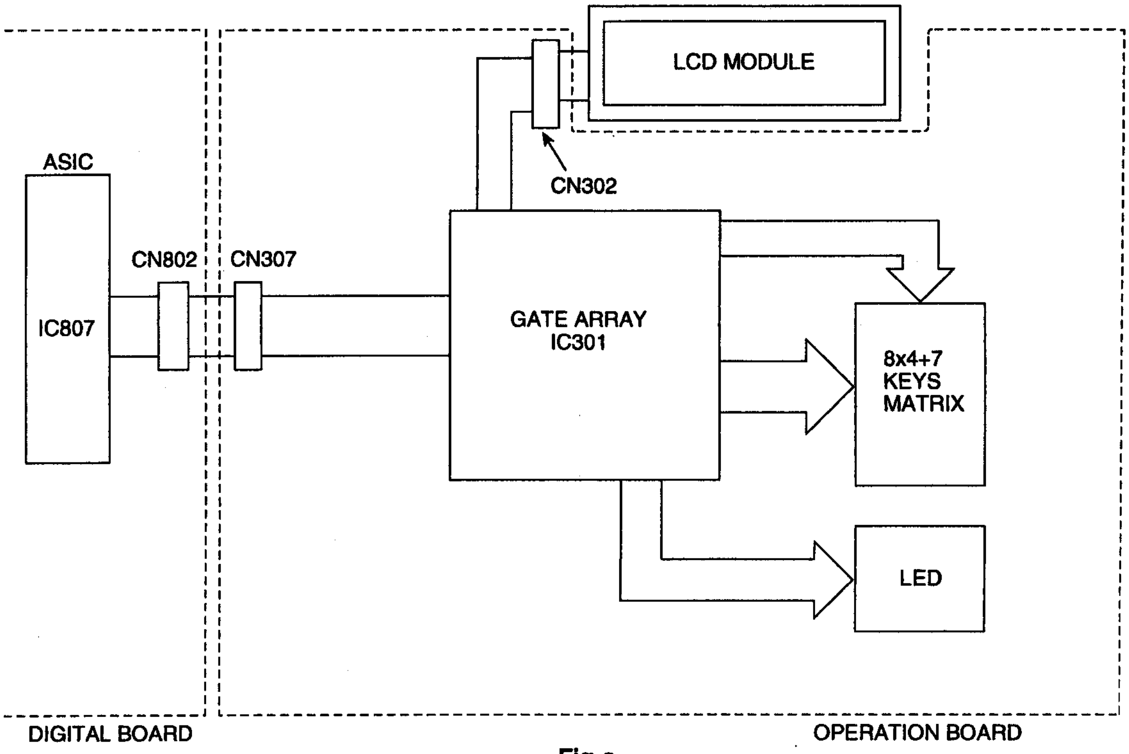

LCD MODULE
ASIC
IC807
CN302
CN802
CN307
GATE ARRAY
IC301
8x4+7
KEYS
MATRIX
LED
DIGITAL BOARD
OPERATION BOARD

Fig-a

Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	KIN7
KSL0	SW301 ONE9.20	SW305 ONE5.16	SW309 ONE1.12	SW313 QUICK SCAN	SW317 *	SW321 7	SW325 4	SW329 1
KSL1	SW302 ONE10.21	SW306 ONE6.17	SW310 ONE2.13	SW314 STOP	SW318 SP-PHONE	SW322 MUTE	SW326 REDIAL/PAUSE	SW330 FLASH
KSL2	SW303 ONE11.22	SW307 ONE7.18	SW311 ONE3.14	SW315 START/SET/COPY	SW319 #	SW323 9	SW327 6	SW331 3
KSL3	SW304 LOWER	SW308 ONE8.19	SW312 ONE4.15	SW316 COLLATE	SW320 0	SW324 8	SW328 5	SW332 2

	XLD15	XLD14	XLD13	XLD12
LED3	SW333 VOL-UP	SW336 VOL-DOWN	SW339 FAX-ON	SW342 IQ-FAX
LED2	SW334 HELP	SW337 MENU		SW343 RESOLUTION

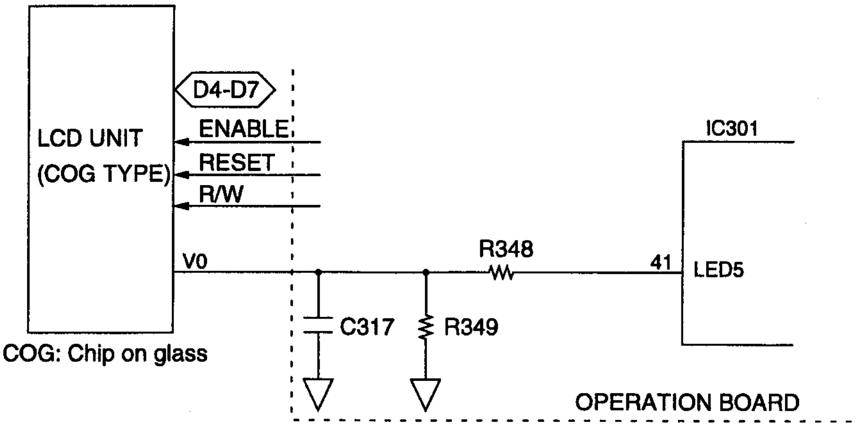
LED

	LED10	LED6
	LED301 SP-PHONE	LED302 FAX ON

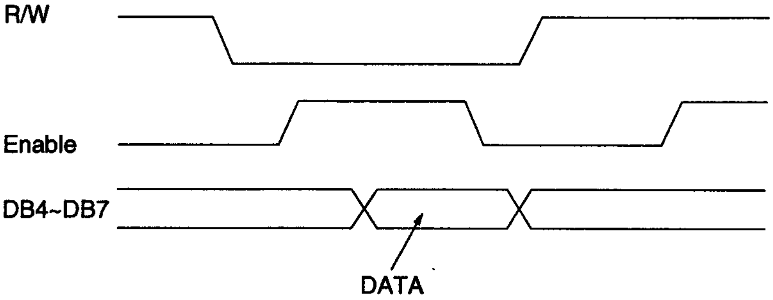
9. LCD SECTION

The Gate Array (IC301) only needs to write the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive. R323 and R322 are density control resistors.
Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram


LCD UNIT
(COG TYPE)
D4-D7
ENABLE
RESET
R/W
V0
R348
41
LED5
IC301
C317
R349
COG: Chip on glass
OPERATION BOARD

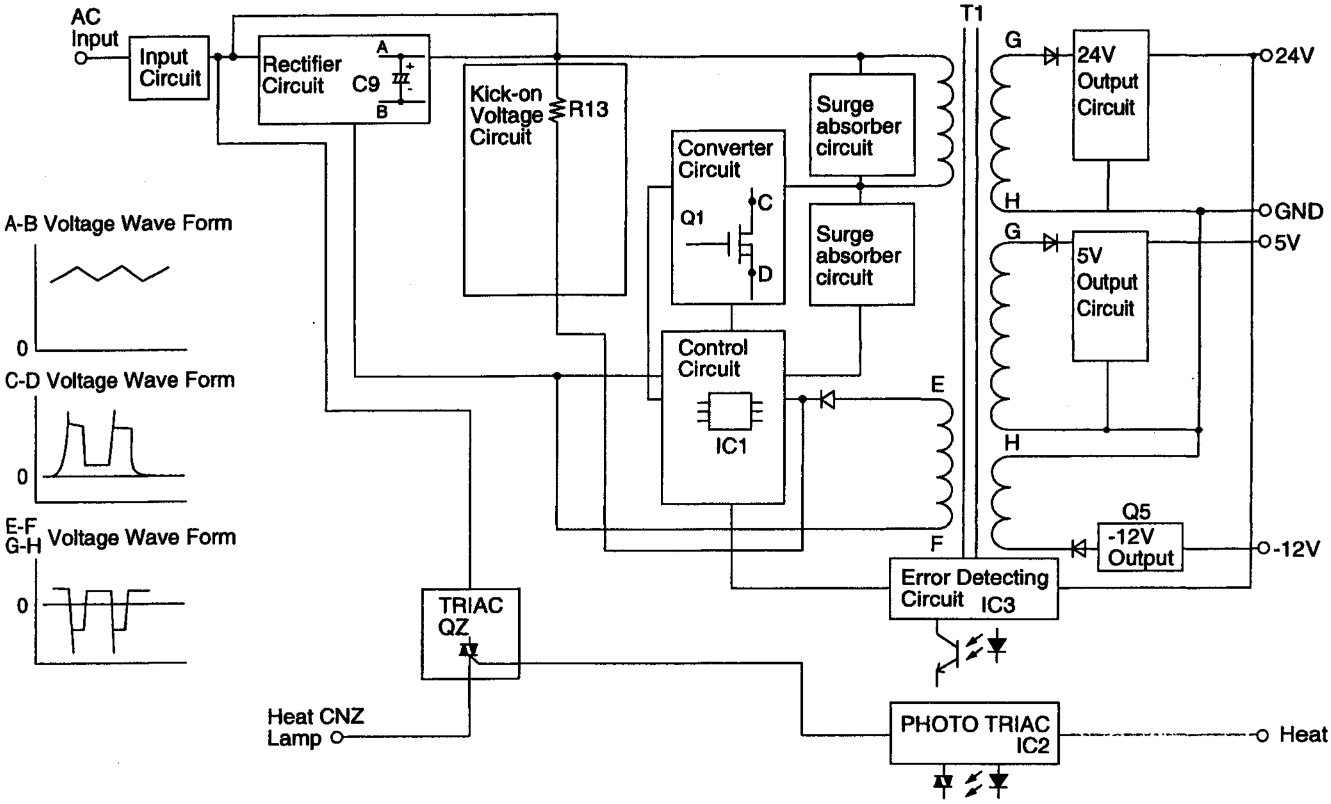
Timing Chart


R/W
Enable
DB4~DB7
DATA

Density	Norma	Dark
LED5 (IC301-41pin)	H	L

10. POWER SUPPLY SECTION

Block Diagram


AC Input
Input Circuit
Rectifier Circuit
C9
A
B
Kick-on Voltage Circuit
R13
Converter Circuit
Q1
C
D
Surge absorber circuit
Surge absorber circuit
Control Circuit
IC1
T1
E
F
G
H
24V Output Circuit
5V Output Circuit
Q5
-12V Output
24V
GND
5V
-12V
Error Detecting Circuit IC3
TRIAC QZ
Heat CNZ Lamp
PHOTO TRIAC IC2
Heat
A-B Voltage Wave Form
C-D Voltage Wave Form
E-F G-H Voltage Wave Form
0

[Input Circuit]
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]
The input current is rectified by D1 and charges C9 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on Voltage Circuit]
Bias is applied to the Q1 gate via this circuit when the AC power is turned on and Q1 begins operating.

10.1. Heat Lamp Control Circuit

The fixing unit are used at high temperature, so that 2 temperature fuses are equipped as a thermistor and a safety device to control the temperature.

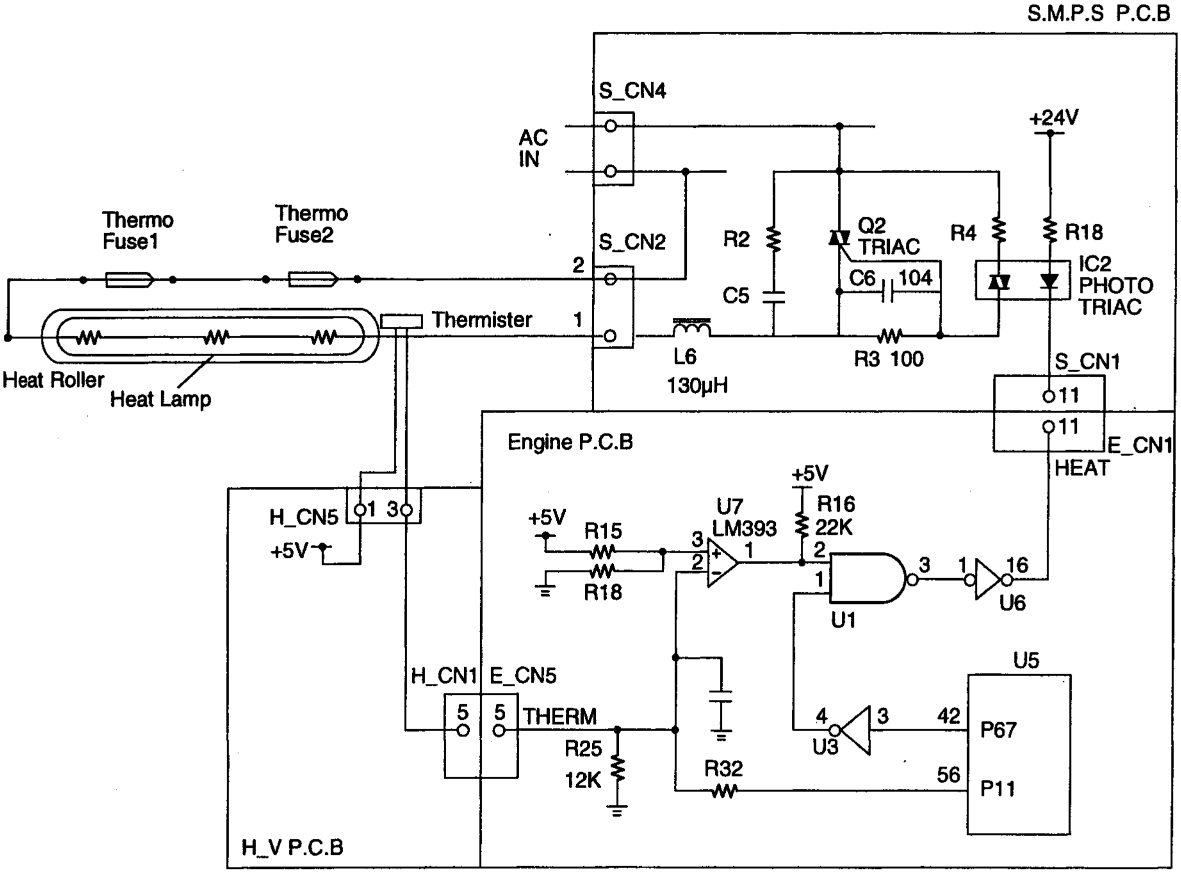
The circuit consists of the temperature detection unit, output control unit, and overheat detection unit.

The heat roller fixing temperature is set to approximately 150°C.
The voltage of thermistor which touches the heat roller is monitored, and controlled to keep a stable temperature of heat lamp by the TRIAC.

When the heater temperature becomes over 175°C (for a minute), "UNIT OVERHEATED" appears and the heat lamp is turned OFF forcedly.

When the temperature does not go high normally because of the fault of the heater control unit, "CALL SERVICE FS" appears.

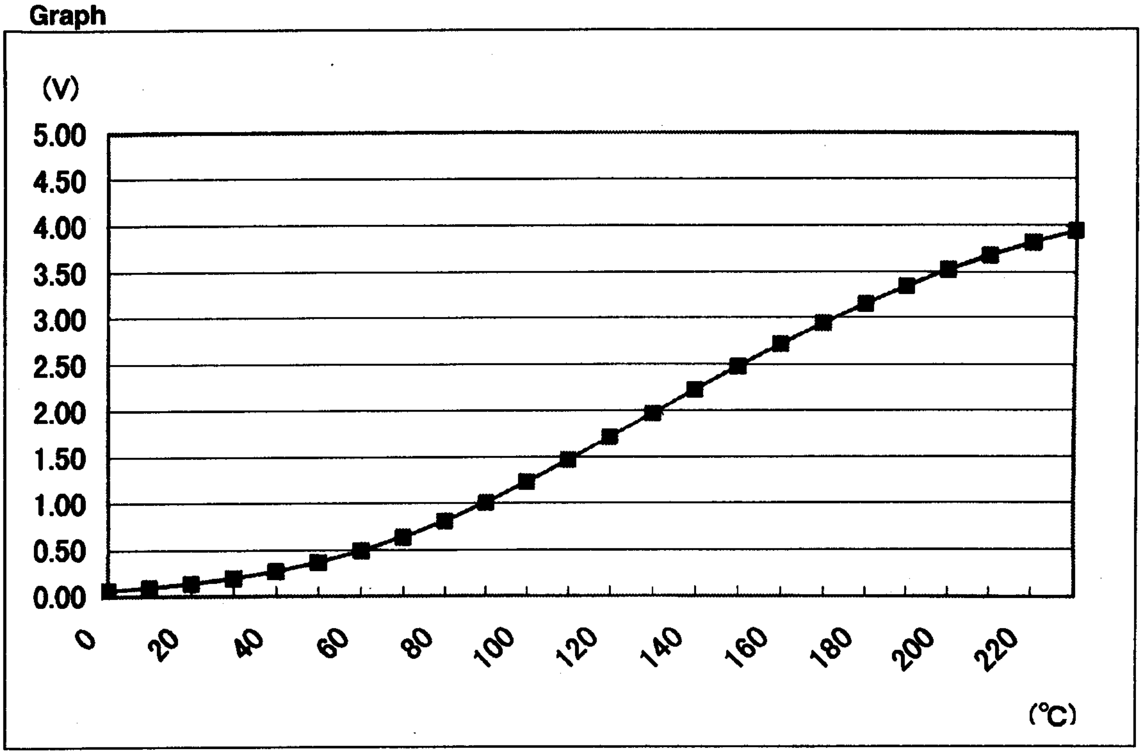
Circuit Diagram


S.M.P.S P.C.B
S_CN4
AC IN
+24V
Thermo Fuse1
Thermo Fuse2
S_CN2
2
1
R2
Q2 TRIAC
R4
R18
C5
C6
104
IC2 PHOTO TRIAC
Thermister
L6
130μH
R3 100
S_CN1
11
11
E_CN1
HEAT
Heat Roller
Heat Lamp
Engine P.C.B
+5V
R16
22K
U7
LM393
+5V
R15
R18
3
2
1
2
1
3
1
16
U1
U6
H_CN5
1
3
+5V
U5
H_CN1
E_CN5
5
5
THERM
R25
12K
R32
4
3
U3
42
P67
56
P11
H_V P.C.B

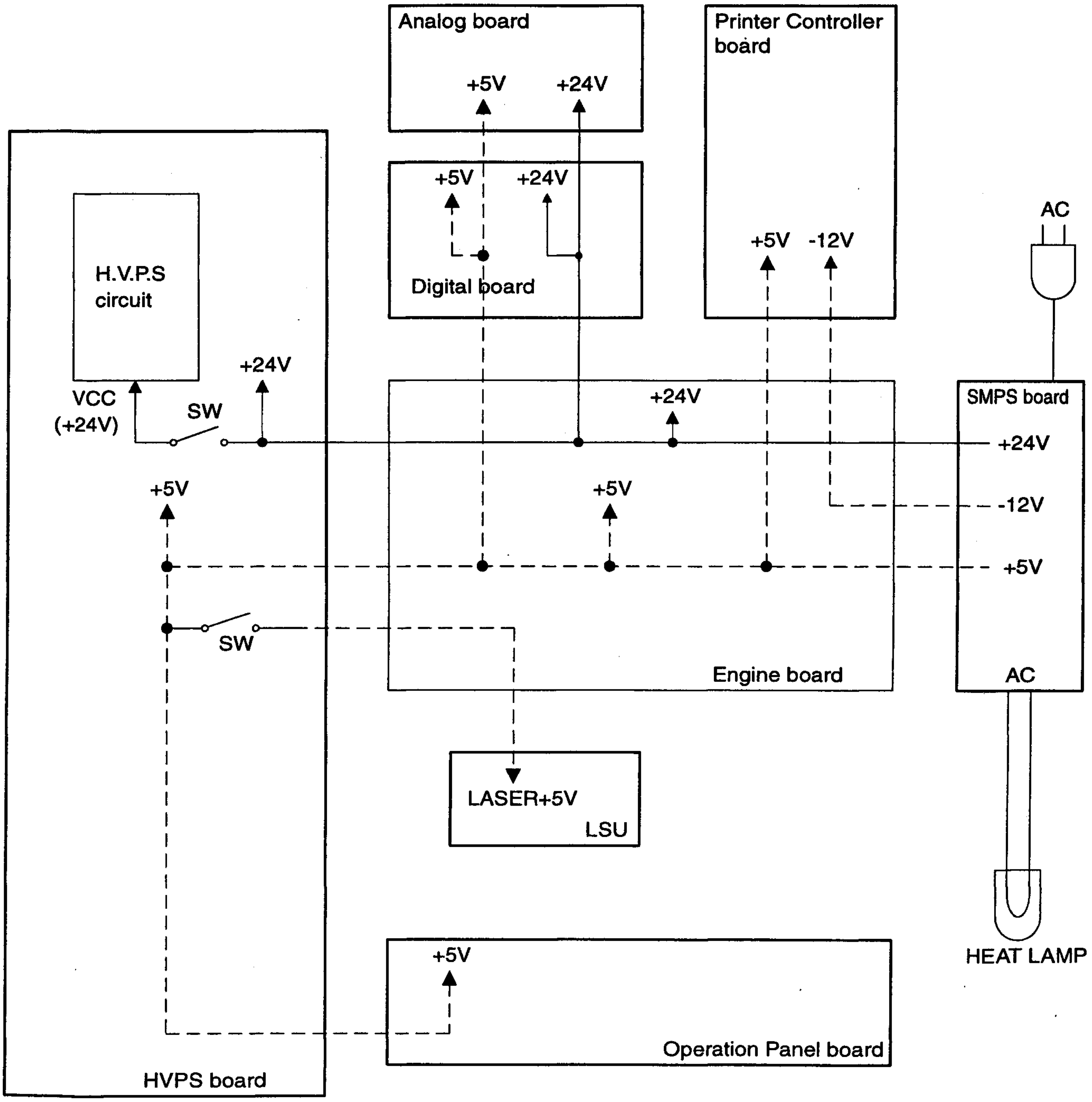
Table

Temperature (°C)	Registor Value (KΩ)	Voltage at pin56 of U5 (V)
20	440	0.13
30	300	0.19
100	37	1.22
150	12	2.48
170	8.4	2.95
180	7	3.15

Graph



10.2 POWER SUPPLY FLOW


Analog board
+5V
+24V
Printer Controller board
+5V
-12V
AC
H.V.P.S circuit
+5V
+24V
Digital board
VCC (+24V)
SW
+24V
+24V
SMPS board
+24V
-12V
+5V
+5V
+5V
SW
Engine board
AC
LASER+5V
LSU
+5V
HEAT LAMP
Operation Panel board
HVPS board

SMPS P.C.B generates +5V, +24V and -12V powers.
Each power is used for

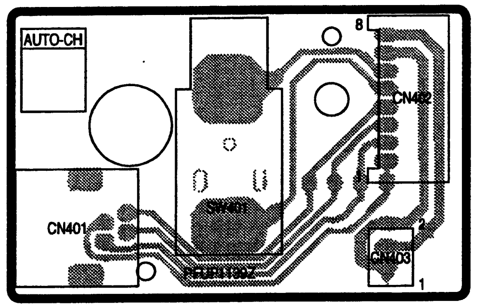
-12V: U12(amplifier) on ICU only.

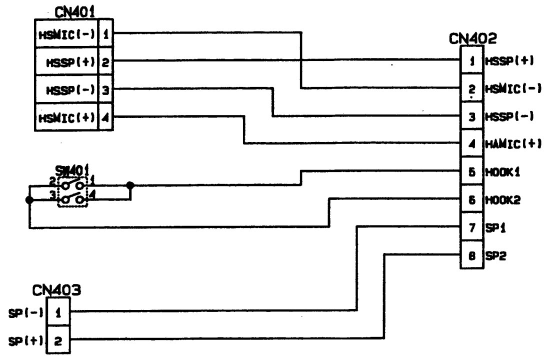
+24V: MOTOR,polygon motor, FAN, high voltage circuit, and amplifier on ANALOG board.

+5V: other logic.

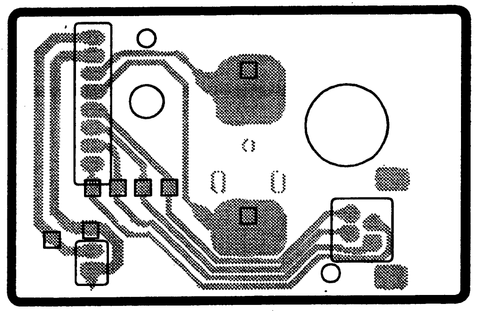
PRINTED CIRCUIT BOARD / SCHEMATIC DIAGRAM (HOOK SWITCH)

(COMPONENT VIEW)


AUTO-CH
8
CN402
CN401
SW401
PFUP1139Z
CN403
2
1


CN401
HSMIC(-) 1
HSSP(+) 2
HSSP(-) 3
HSMIC(+) 4
CN402
1 HSSP(+)
2 HSMIC(-)
3 HSSP(-)
4 HAMIC(+)
5 HOOK1
6 HOOK2
7 SP1
8 SP2
SW401
2
1
3
4
CN403
SP(-) 1
SP(+) 2

(BOTTOM VIEW)



PRINTED CIRCUIT BOARD (DIGITAL)

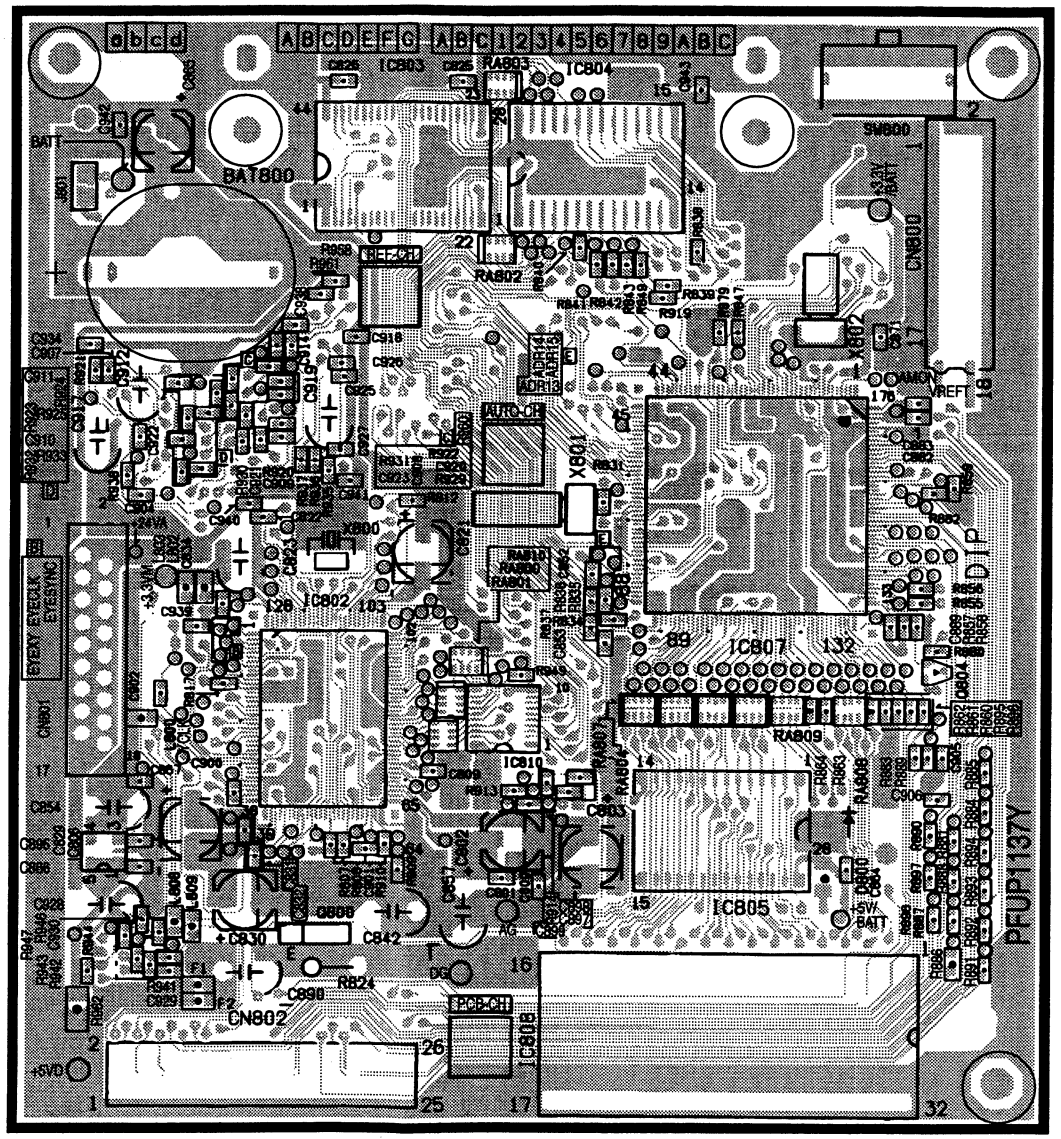
1 2 3 4 5 6 7 8 9 10 11 12

A

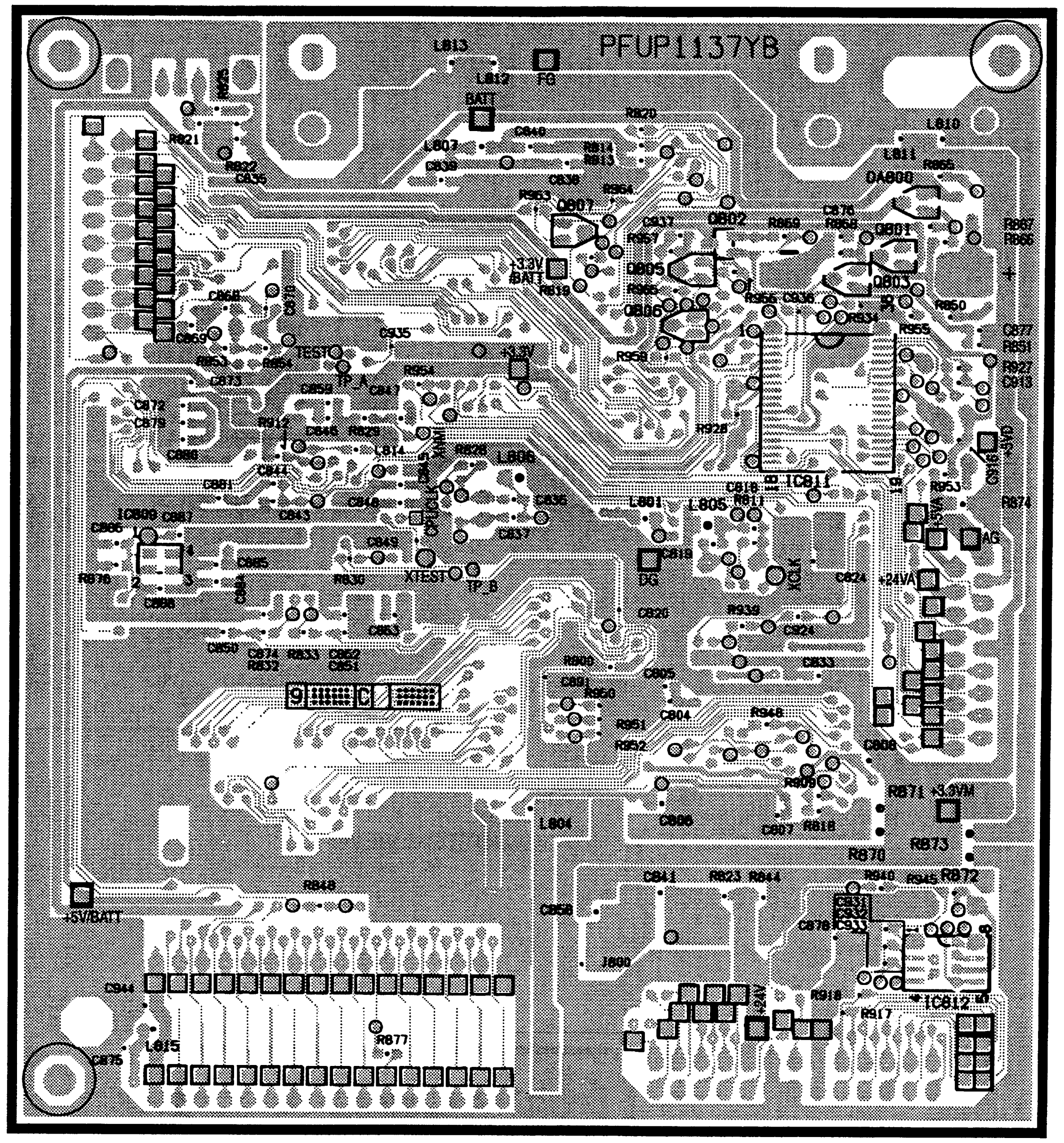
(COMPONENT VIEW)

(BOTTOM VIEW)

B



BAT800
IC803
IC804
RA803
SW800
CN800
RA802
X801
IC802
IC807
IC805
IC810
IC808
CN802
CN801
RA809
RA806
RA801
PFUP1137Y
+5VD
+5V/BATT
BATT



PFUP1137YB
L813
L812
L811
L810
DA800
Q807
Q802
Q801
Q803
Q805
Q806
IC811
IC809
IC812
L805
L806
L804
L815
+3.3V
+3.3VM
+24VA
TEST
XTEST
DG
FG
+5V/BATT

C

D

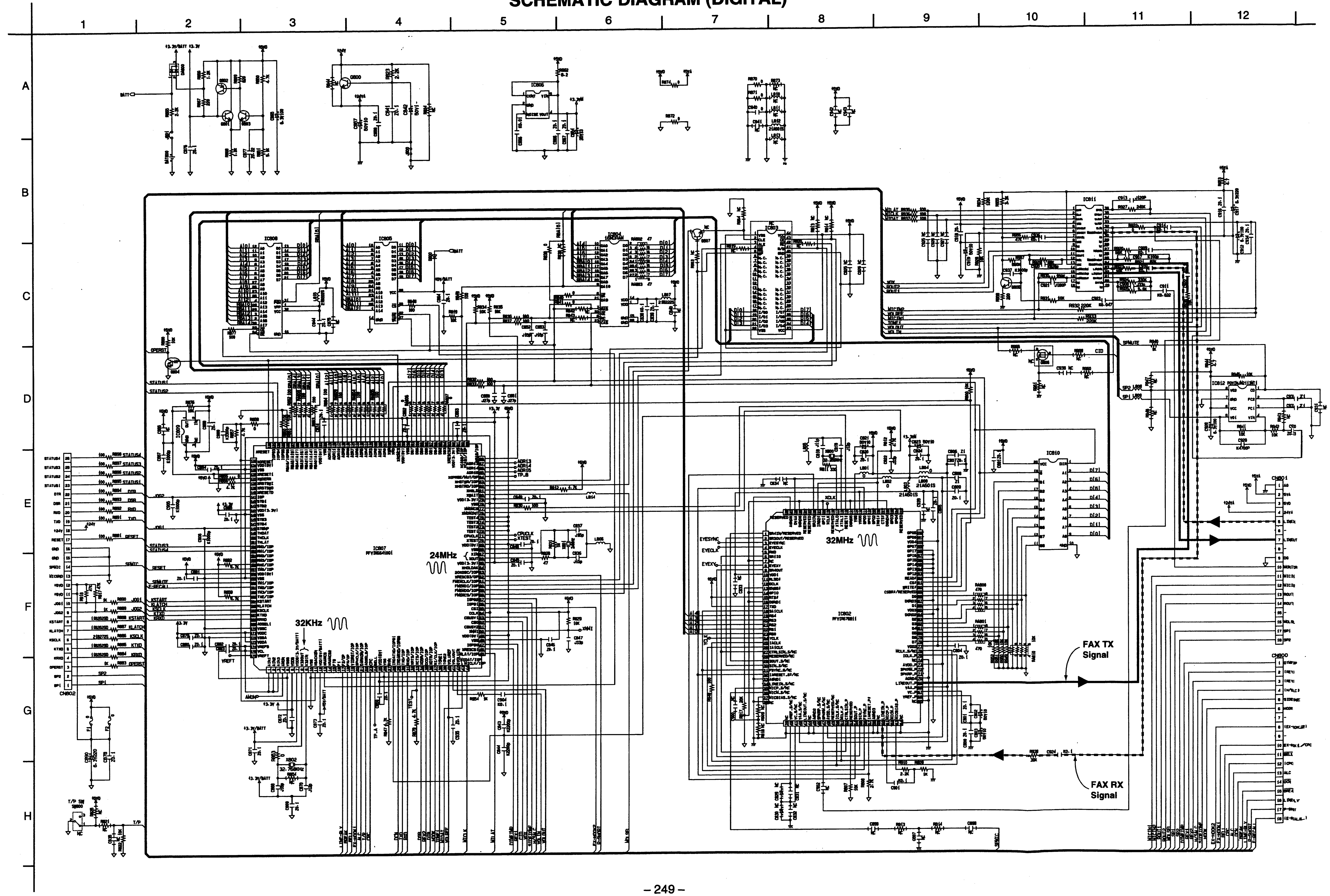
E

F

G

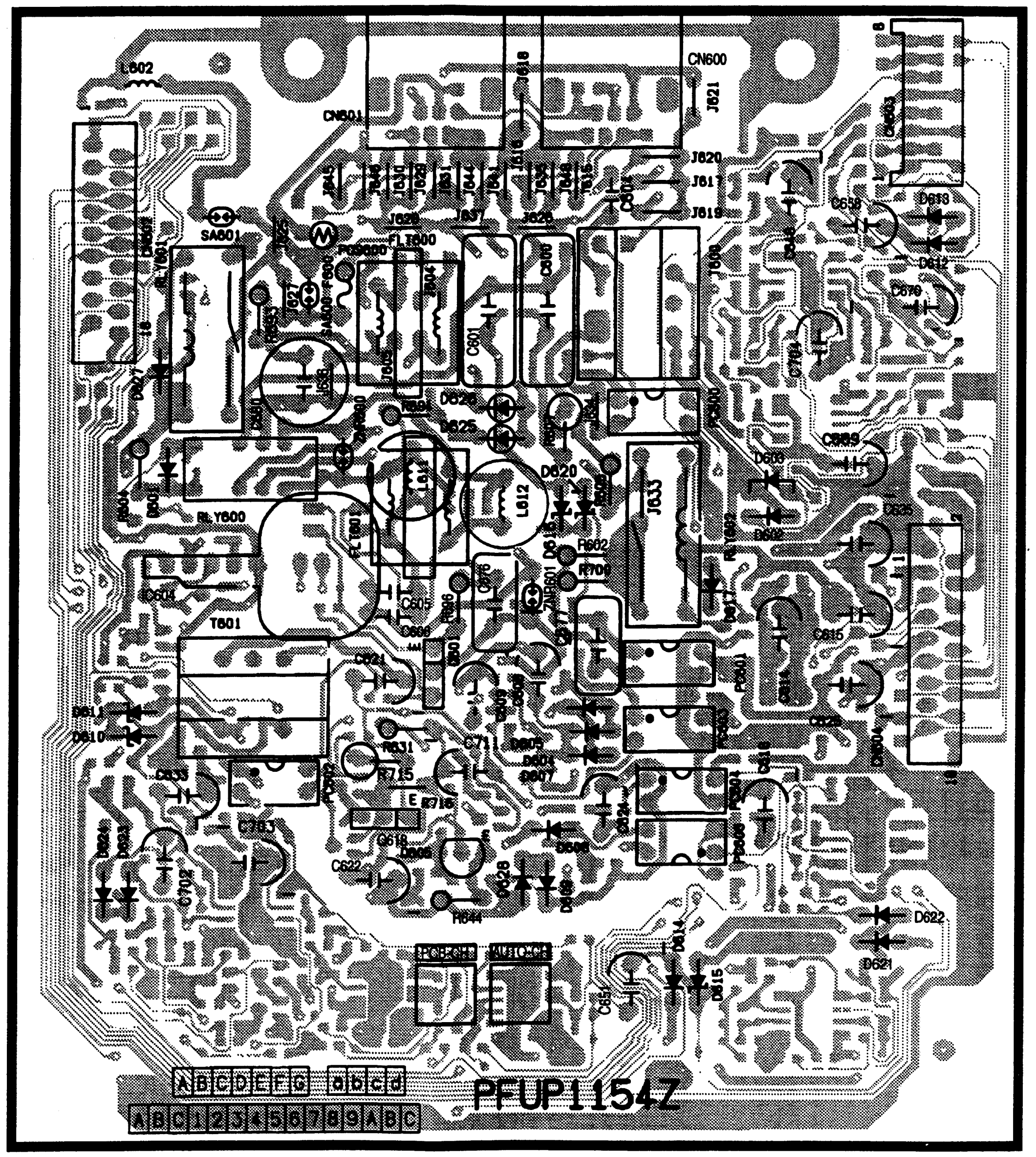
H

SCHEMATIC DIAGRAM (DIGITAL)

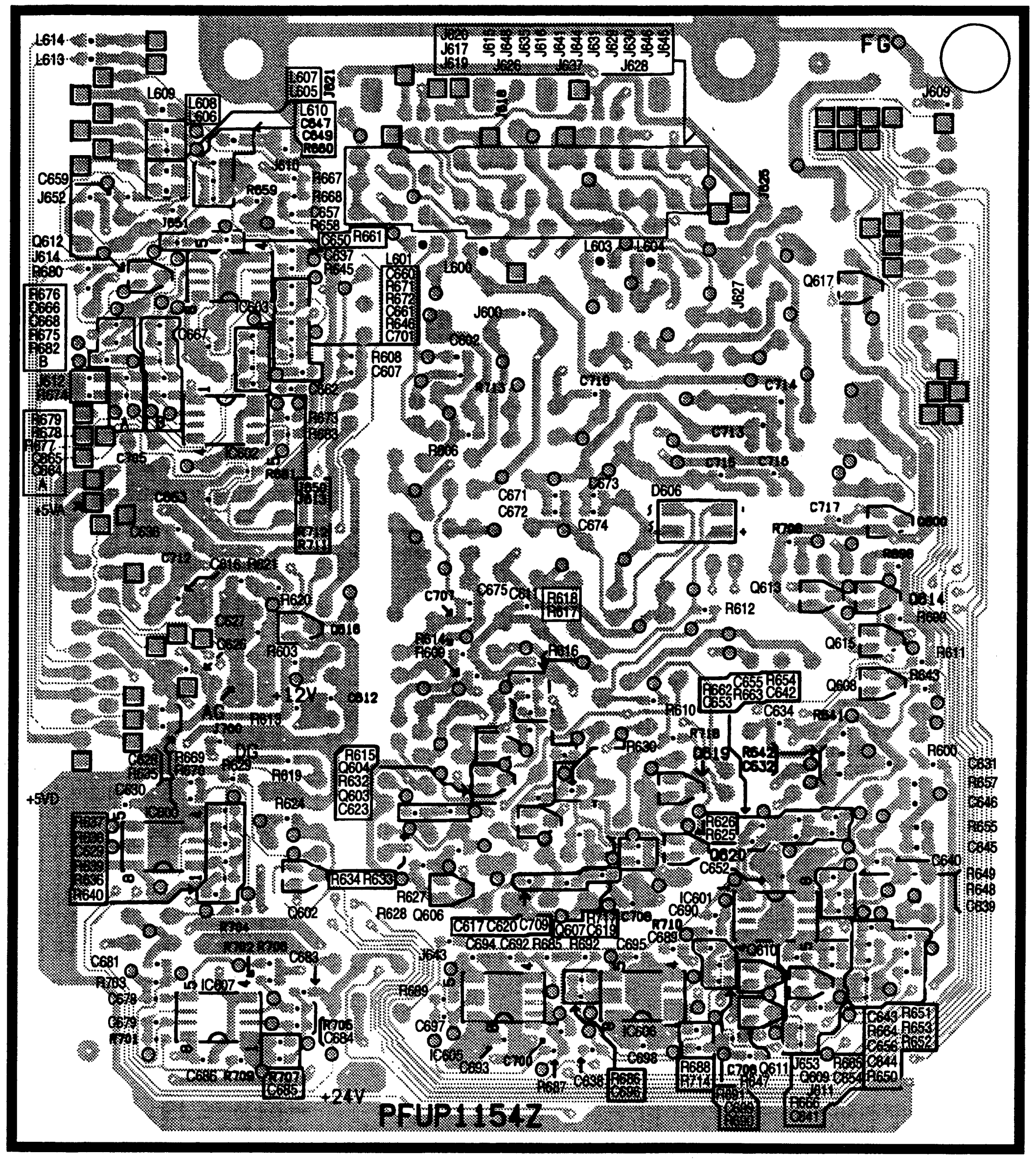

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
IC808
IC806
IC804
IC803
IC811
IC807
IC802
IC810
IC812
CN802
CN801
CN800
24MHz
32KHz
32MHz
EYESYNC
EYECLK
EYEXC
FAX TX
Signal
FAX RX
Signal

PRINTED CIRCUIT BOARD (ANALOG)

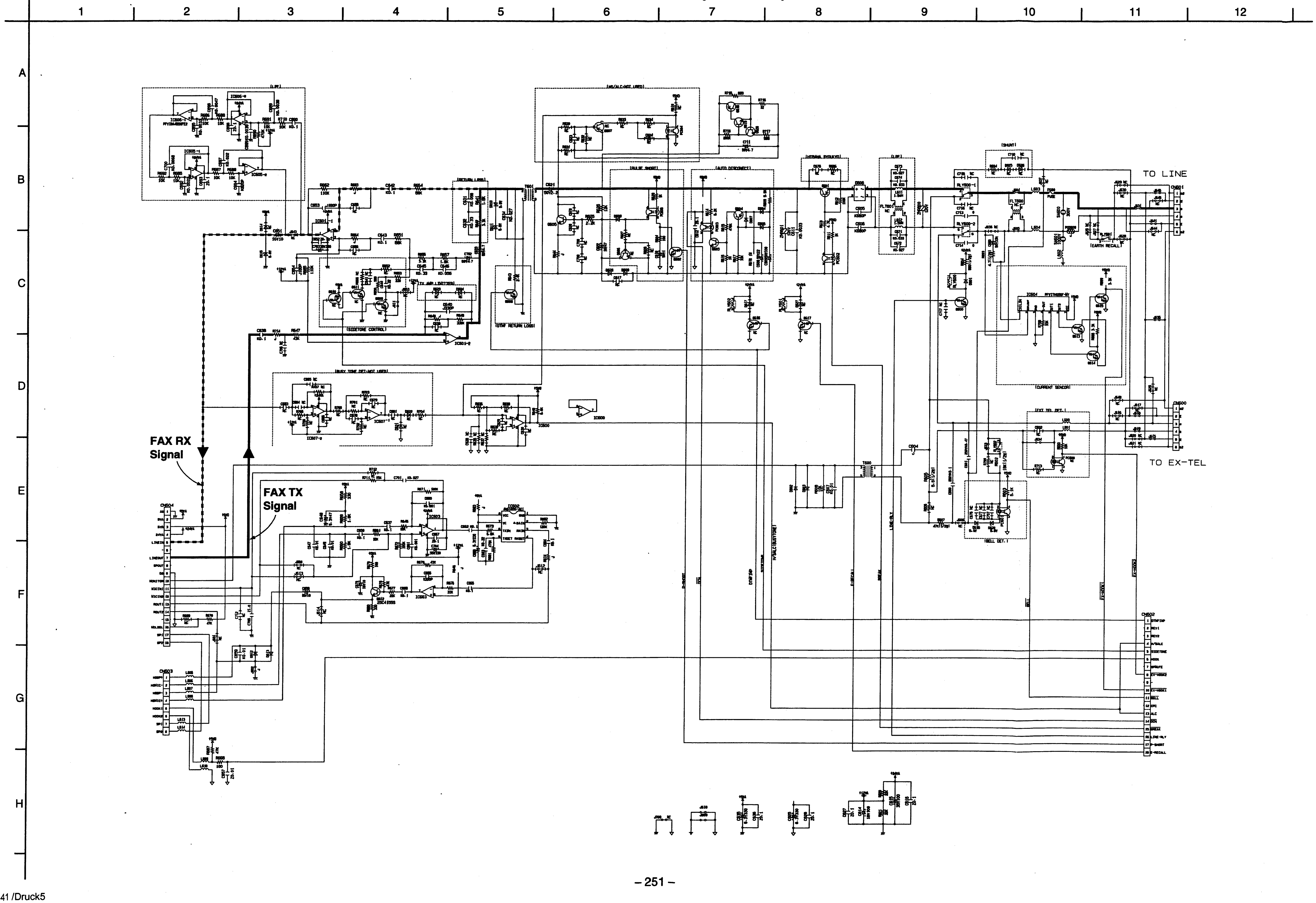
(COMPONENT VIEW)


PFUP1154Z
A B C D E F G a b c d
A B C 1 2 3 4 5 6 7 8 9 A B C

(BOTTOM VIEW)


PFUP1154Z
FG
+24V
+12V
+5VD
+5VA

SCHEMATIC DIAGRAM (ANALOG)

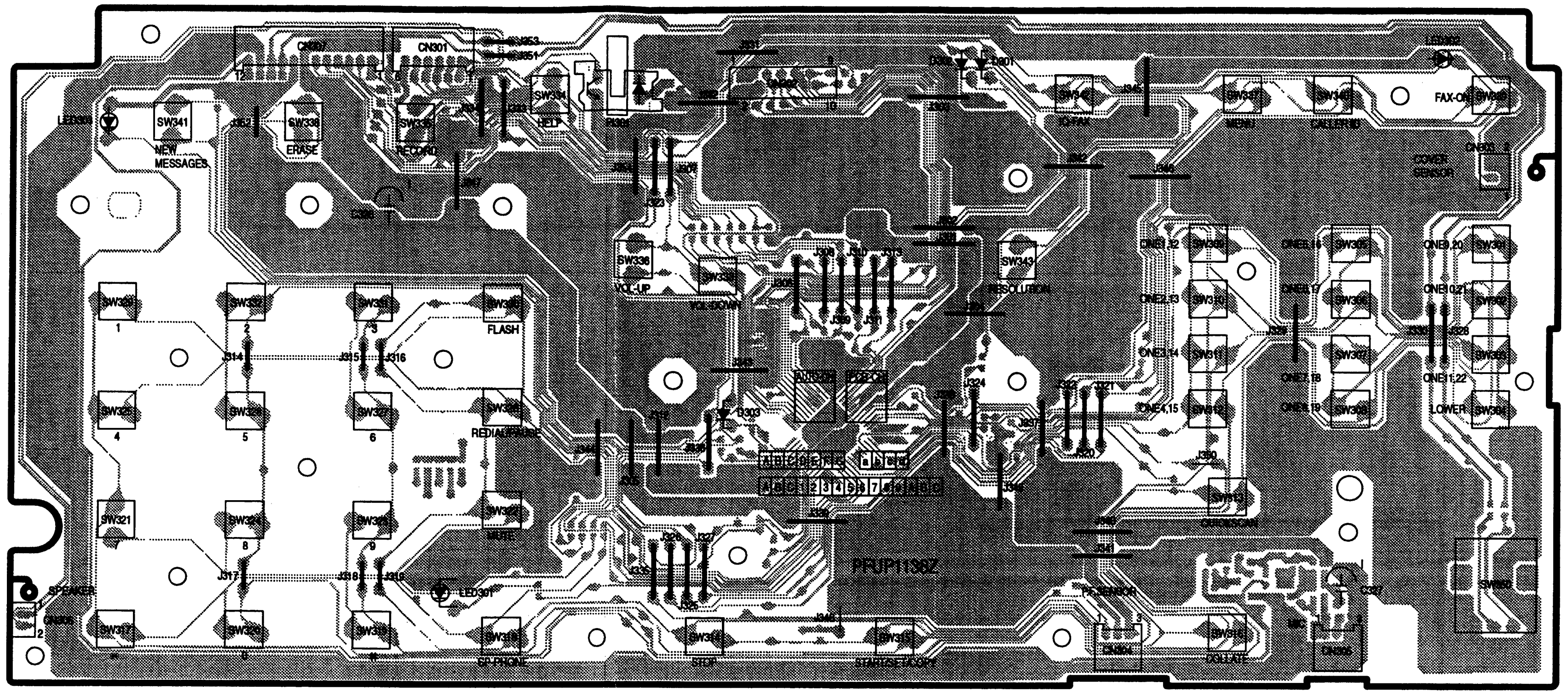

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
FAX RX Signal
FAX TX Signal
TO LINE
TO EX-TEL
CN504
CN503
CN501
CN500
CN502
IC606-1
IC606-2
IC605-1
IC605-2
IC601-2
IC607-2
IC603
IC602
IC604
T601
T600
RLY600-1
RLY600-2
(LPF)
(SHUNT)
(SIDETONE CONTROL)
(TX AMP LIMITTER)
(DTMF RETURN LOSS)
(BUSY TONE DET)(NOT USED)
(CURRENT SENCOR)
(EXT TEL DET)
(BELL DET.)
(EARTH RECALL)
(PULSE SHORT)
(AUTO DISCONNECT)
2SC4155S

PRINTED CIRCUIT BOARD (OPERATION)

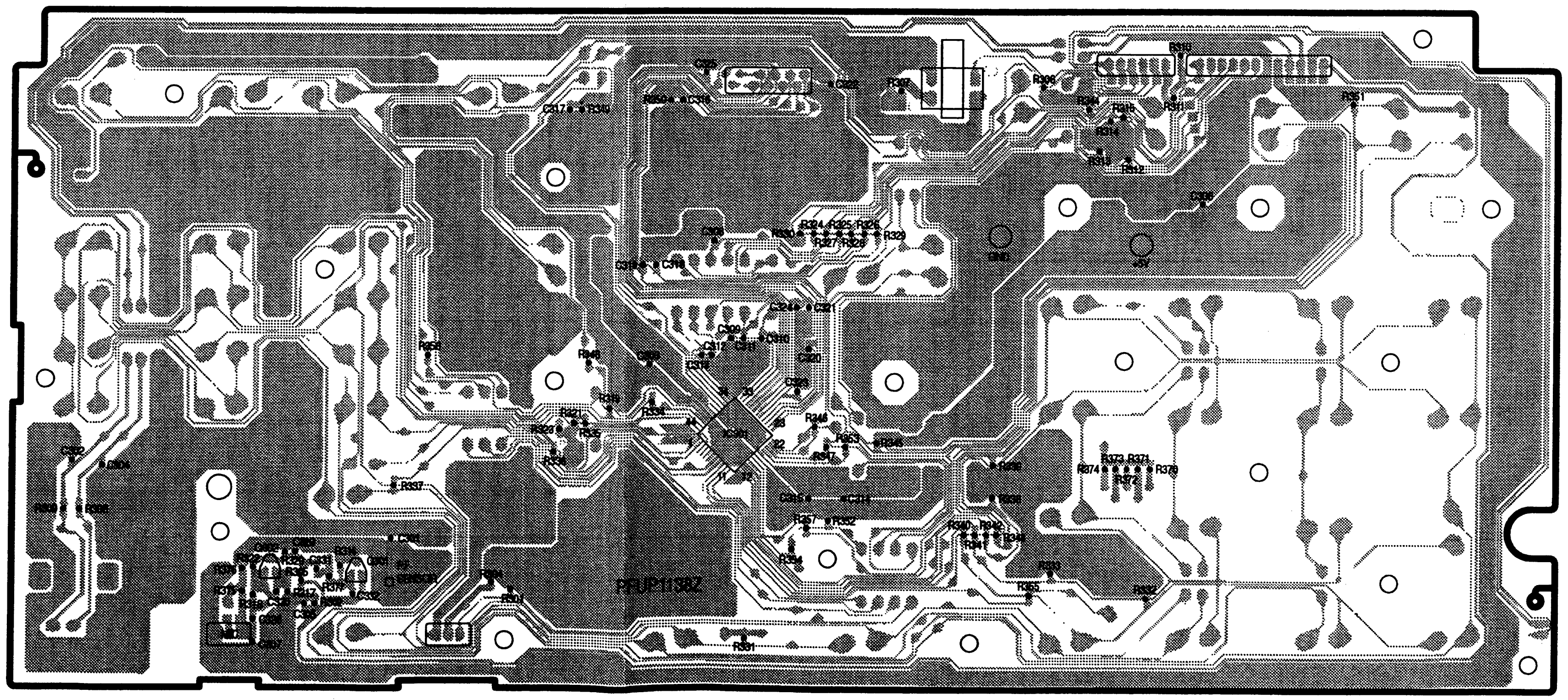
1 2 3 4 5 6 7 8 9 10 11 12

A B C D E F G H

(COMPONENT VIEW)

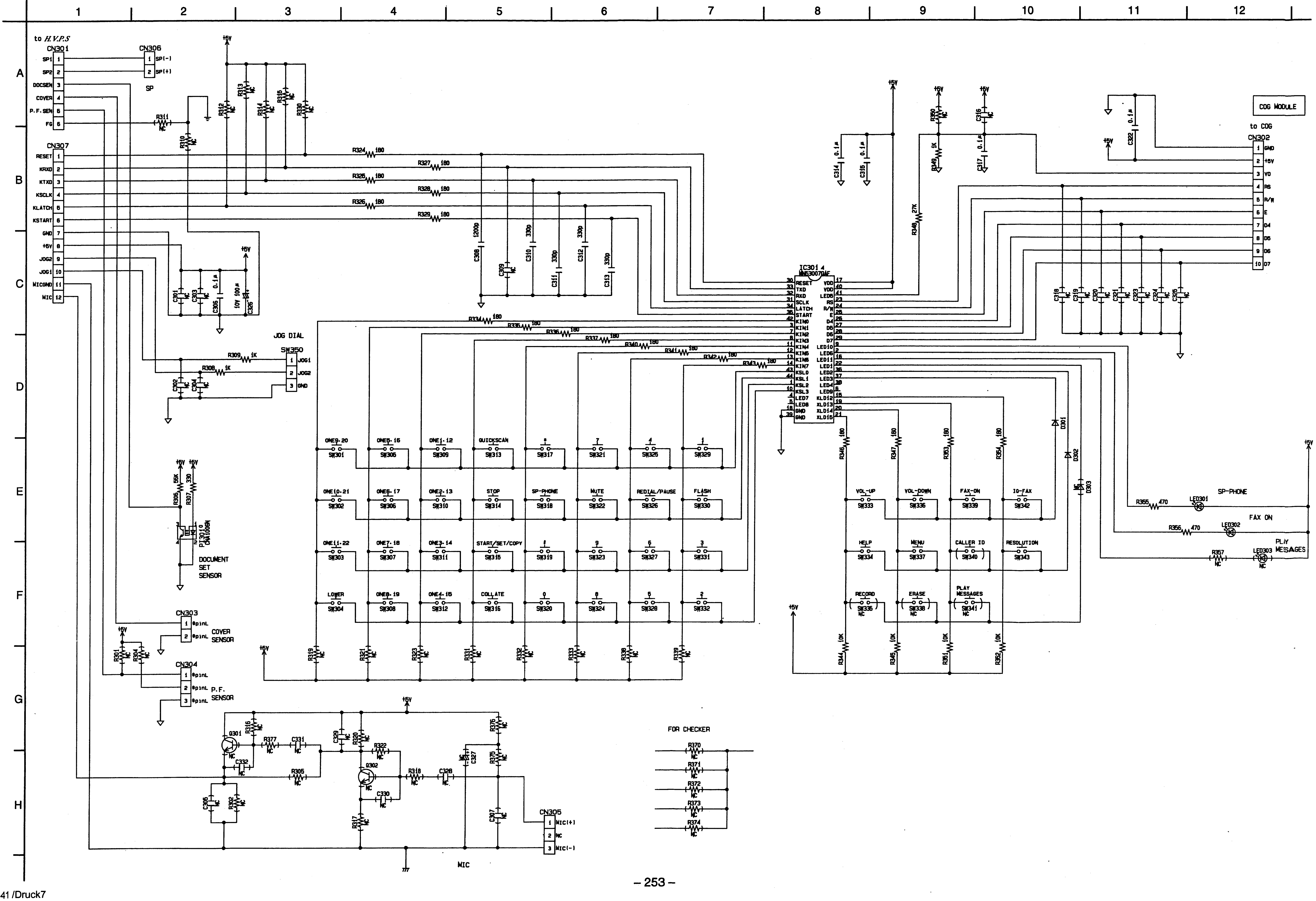

LED300
SW341
NEW MESSAGES
ERASE
RECORD
FLASH
REDIAL/PAUSE
MUTE
SPEAKER
LED301
SP-PHONE
STOP
START/COPY
COLLATE
VOL-UP
VOL-DOWN
RESOLUTION
MENU
CALLER ID
FAX-ON
COVER SENSOR
LOWER
PFUP1136Z
1
2
3
4
5
6
7
8
9

(BOTTOM VIEW)

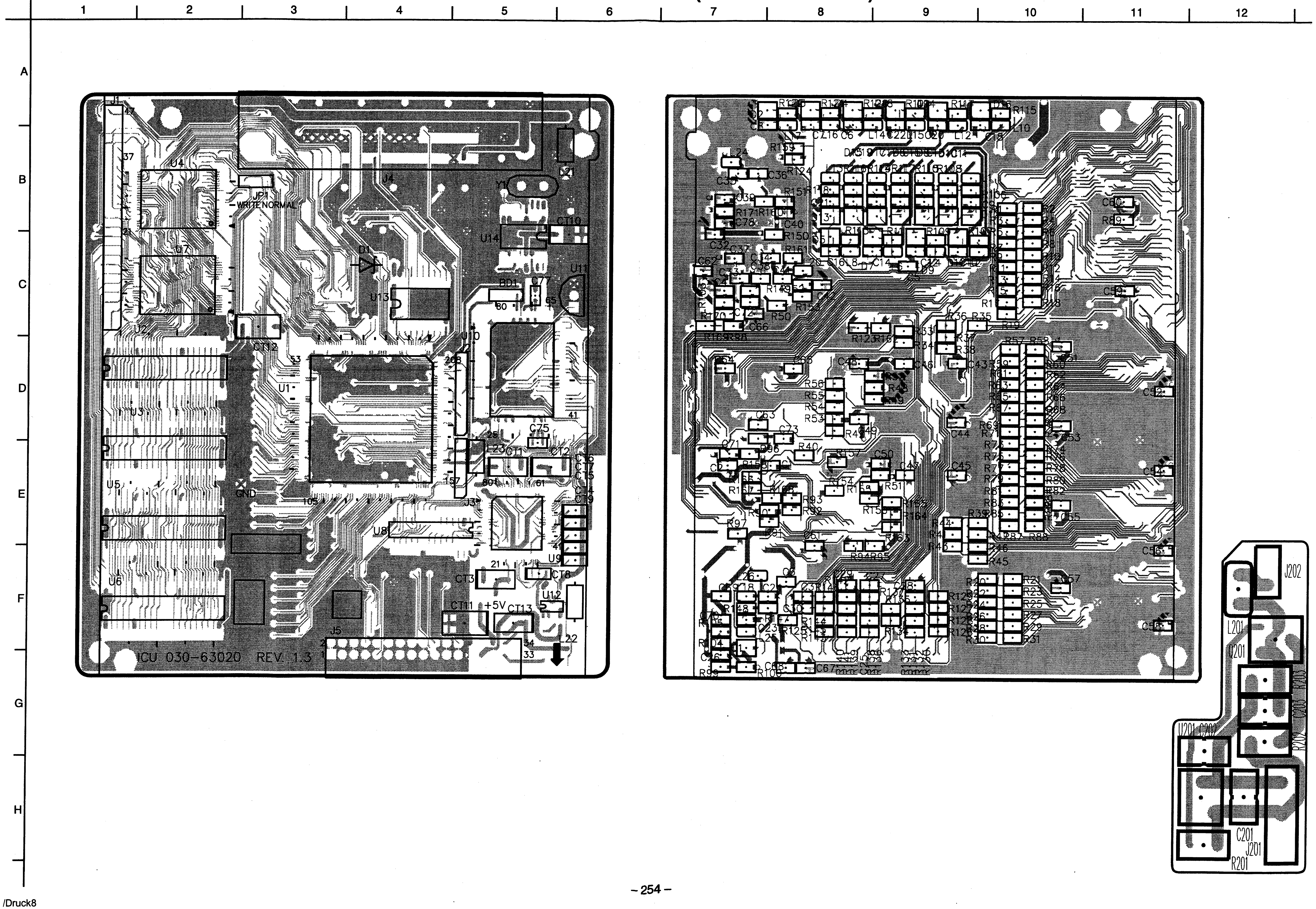


KX-FLM600G **KX-FLM600G**

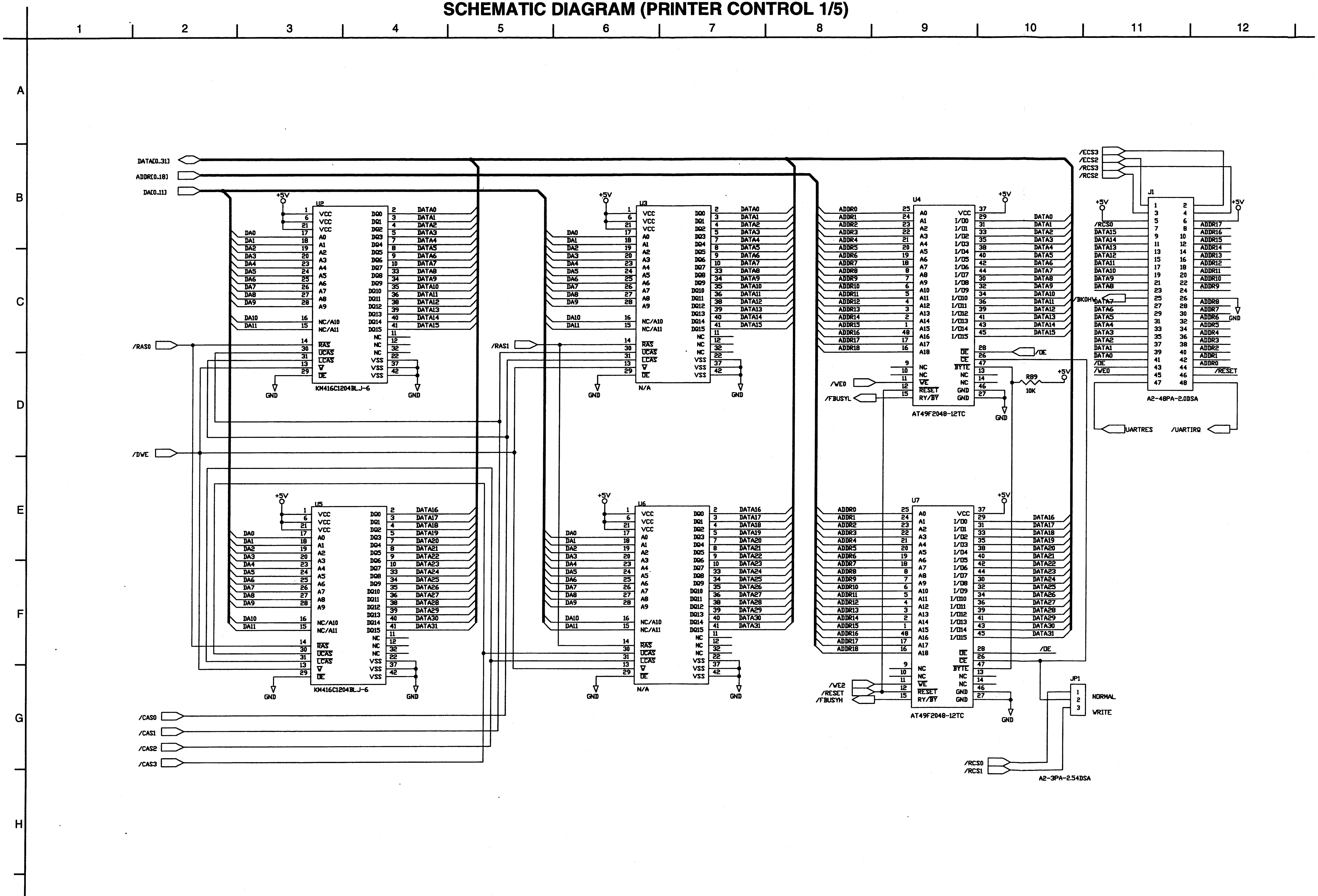
SCHEMATIC DIAGRAM (OPERATION)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
to H.V.P.S
CN301
SP1
SP2
DOCSEN
COVER
P.F.SEN
FG
CN306
SP(-)
SP(+)
SP
R311
NC
R310
+5V
R312
R313
R314
R315
R330
CN307
RESET
KRXD
KTXD
KSCLK
KLATCH
KSTART
GND
+5V
JOG2
JOG1
MICGND
MIC
R324 180
R327 180
R325 180
R328 180
R326 180
R329 180
C308 1200p
C309 NC
C310 330p
C311 330p
C312 330p
C313 330p
C301 NC
C303 NC
C305 0.1µ
C326 10V 100µ
JOG DIAL
SW350
JOG1
JOG2
GND
R309 1K
R308 1K
C302 NC
C304 NC
IC301
MN6300701F
RESET
TXD
RXD
SCLK
LATCH
START
KIN0
KIN1
KIN2
KIN3
KIN4
KIN5
KIN6
KIN7
KSL0
KSL1
KSL2
KSL3
LED7
LED8
GND
GND
VDD
VDD
LED5
RS
R/W
E
D4
D5
D6
D7
LED10
LED6
LED11
LED1
LED2
LED3
LED4
LED9
XLD12
XLD13
XLD14
XLD15
R334 180
R335 180
R336 180
R337 180
R340 180
R341 180
R342 180
R343 180
C314 0.1µ
C315 0.1µ
R350 NC
R349 1K
C316 NC
C317 0.1µ
R348 27K
C318
C319
C320
C321
C323
C324
C325
NC
C322 0.1µ
COG MODULE
to COG
CN302
GND
+5V
VO
RS
R/W
E
D4
D5
D6
D7
ONE0-20
SW301
ONE5-16
SW305
ONE1-12
SW309
QUICKSCAN
SW313
*
SW317
7
SW321
4
SW325
1
SW329
ONE10-21
SW302
ONE6-17
SW306
ONE2-13
SW310
STOP
SW314
SP-PHONE
SW318
MUTE
SW322
REDIAL/PAUSE
SW326
FLASH
SW330
ONE11-22
SW303
ONE7-18
SW307
ONE3-14
SW311
START/SET/COPY
SW315
#
SW319
9
SW323
6
SW327
3
SW331
LOWER
SW304
ONE8-19
SW308
ONE4-15
SW312
COLLATE
SW316
0
SW320
8
SW324
5
SW328
2
SW332
R319 NC
R321 NC
R323 NC
R331 NC
R332 NC
R333 NC
R338 NC
R339 NC
R345 180
R347 180
R353 180
R354 180
D301
D302
D303 NC
VOL-UP
SW333
VOL-DOWN
SW336
FAX-ON
SW339
IQ-FAX
SW342
HELP
SW334
MENU
SW337
CALLER ID
SW340
RESOLUTION
SW343
RECORD
SW335 NC
ERASE
SW338 NC
PLAY MESSAGES
SW341 NC
R344 10K
R346 10K
R351 10K
R352 10K
R355 470
LED301
SP-PHONE
R356 470
LED302
FAX ON
R357 NC
LED303 NC
PLAY MESSAGES
R306 56K
R307 330
PI301 NC
CN1006N
DOCUMENT SET SENSOR
CN303
φpinL
COVER SENSOR
R301 NC
R304 NC
CN304
P.F. SENSOR
Q301 NC
R316 NC
R377 NC
C331 NC
C332 NC
R305 NC
C306 NC
R302 NC
C329 NC
R320 NC
R322 NC
Q302 NC
R318 NC
C328 NC
C330 NC
R317 NC
C327 NC
R376 NC
R375 NC
C307 NC
CN305
MIC(+)
NC
MIC(-)
MIC
FOR CHECKER
R370 NC
R371 NC
R372 NC
R373 NC
R374 NC

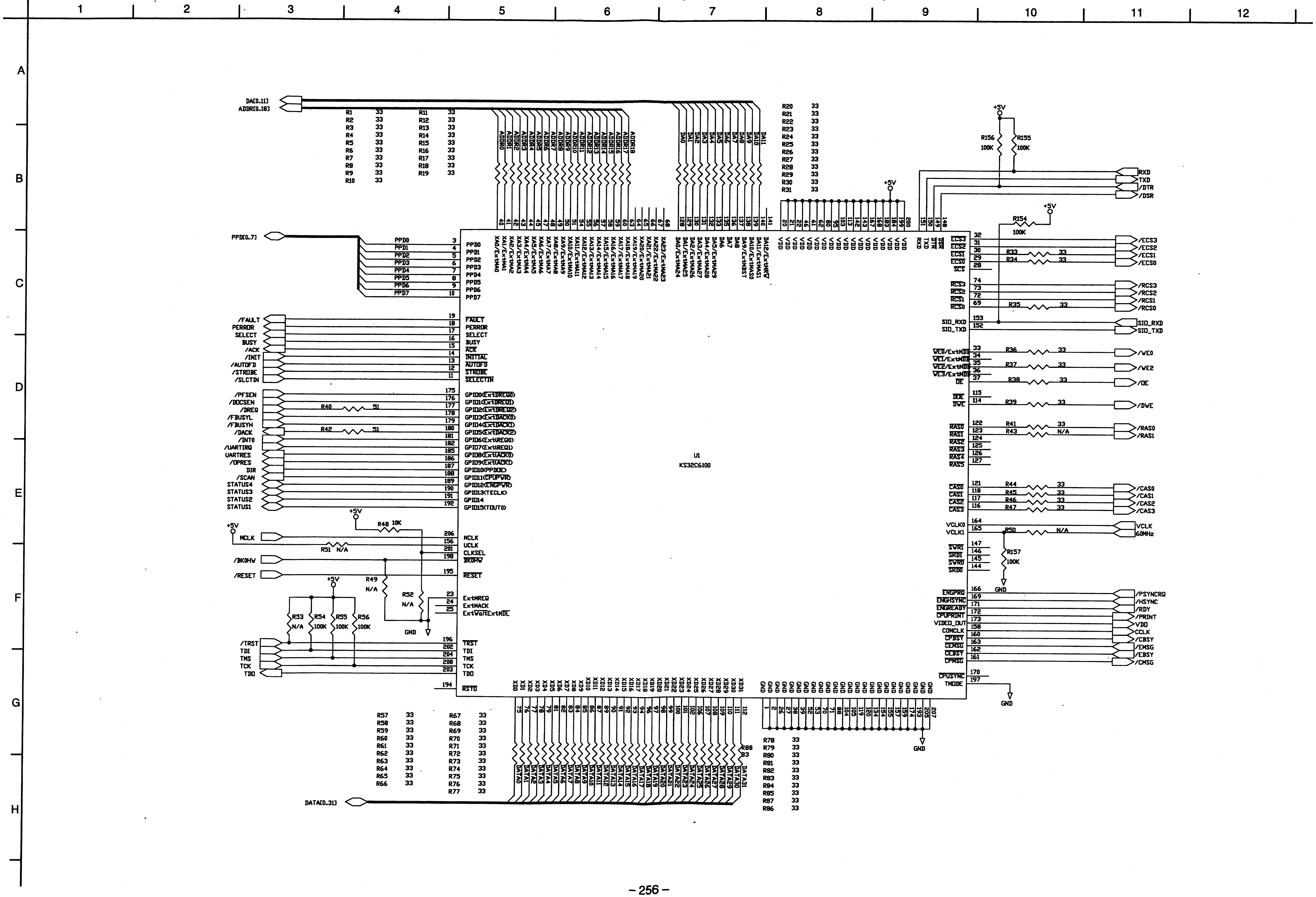
PRINTED CIRCUIT BOARD (PRINTER CONTROL)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
J1
U4
JP1
WRITE NORMAL
J4
Y1
U14
CT10
U7
D1
U13
U11
BD1
C77
U2
CT12
U10
U1
U3
C75
L23
CT1
CT2
U5
GND
J3
U8
U9
U6
CT3
CT8
U12
CT11
+5V
CT13
J5
L22
ICU 030-63020 REV. 1.3
J202
L201
Q201
U201
C202
C201
J201
R201

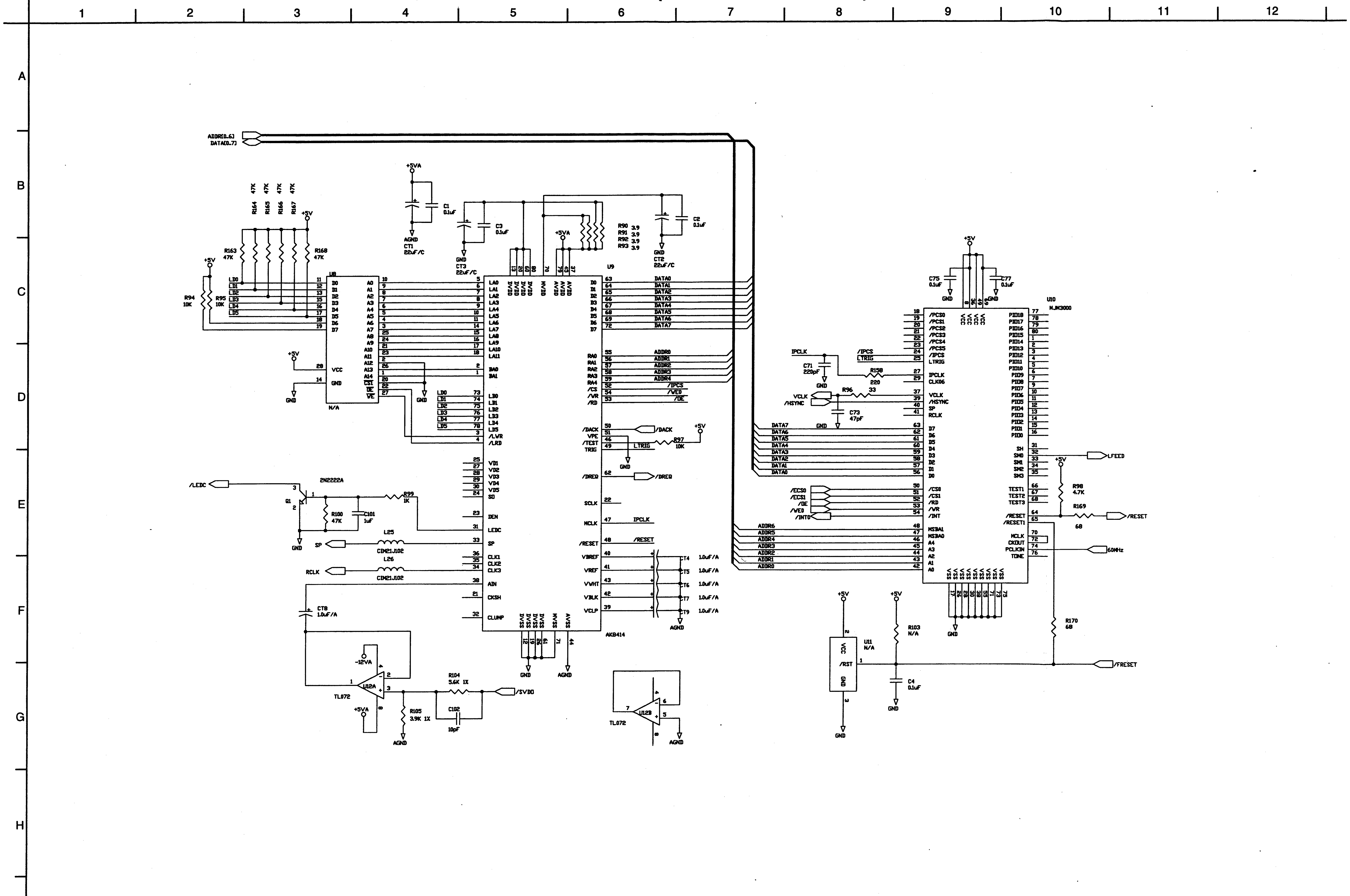
SCHEMATIC DIAGRAM (PRINTER CONTROL 1/5)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
DATA[0..31]
ADDR[0..18]
DA[0..11]
/RAS0
/RAS1
/DWE
/CAS0
/CAS1
/CAS2
/CAS3
+5V
GND
U2
KM416C1204BLJ-6
U3
N/A
U5
KM416C1204BLJ-6
U6
N/A
U4
AT49F2048-12TC
U7
AT49F2048-12TC
J1
A2-48PA-2.0DSA
JP1
A2-3PA-2.54DSA
NORMAL
WRITE
R89
10K
/ECS3
/ECS2
/RCS3
/RCS2
/RCS0
/RCS1
/OE
/WE0
/WE2
/RESET
/FBUSYL
/FBUSYH
/BKOHV
UARTRES
/UARTIRQ
VCC
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
NC/A10
NC/A11
RAS
UCAS
LCAS
W
OE
DQ0
DQ15
VSS
NC
I/O0
I/O15
A18
BYTE
RESET
RY/BY
WE
CE
DATA0
DATA15
DATA16
DATA31
ADDR0
ADDR18
DA0
DA11

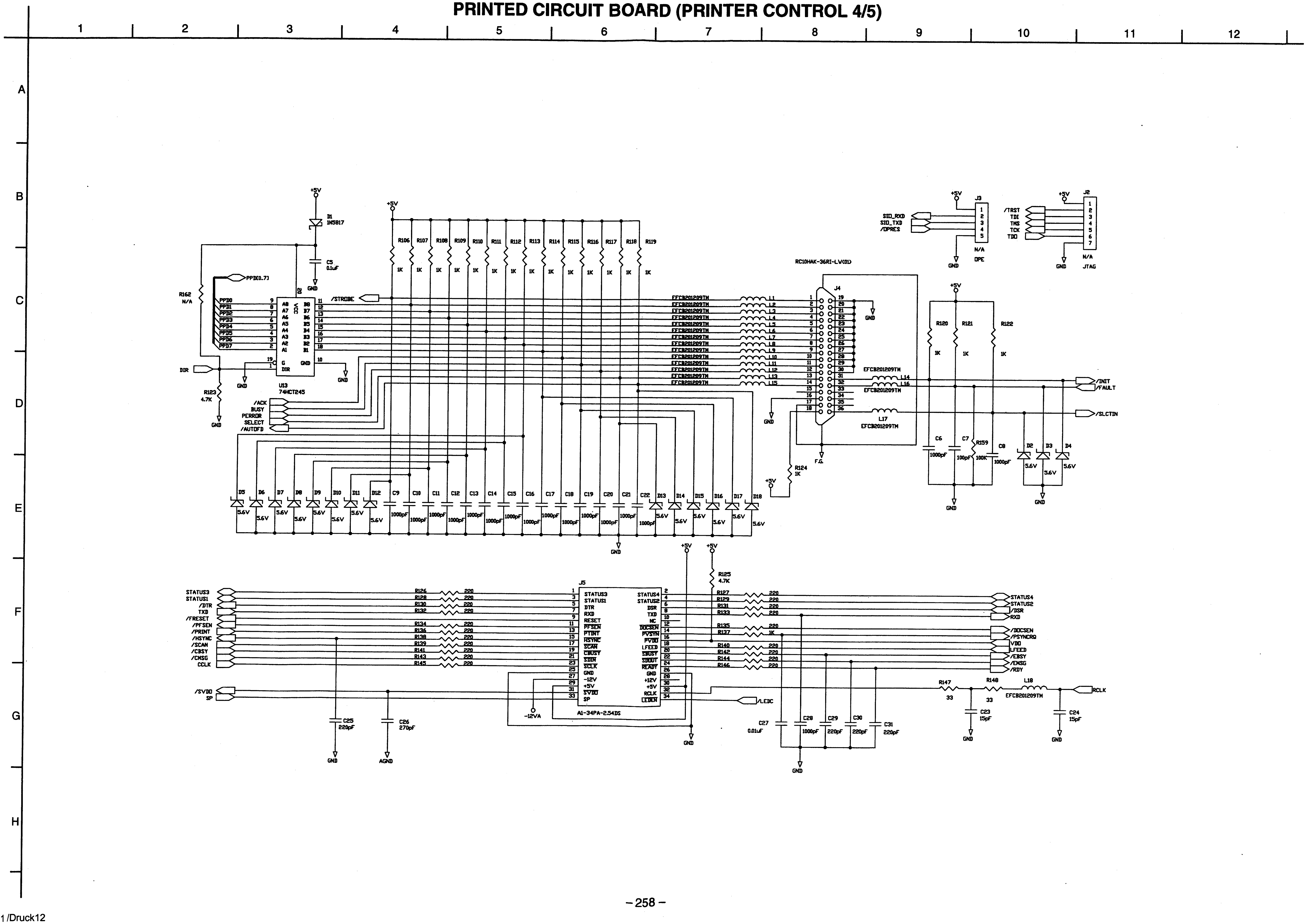
PRINTED CIRCUIT BOARD (PRINTER CONTROL 2/5)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
DA[0..11]
ADDR[0..18]
R1 33
R2 33
R3 33
R4 33
R5 33
R6 33
R7 33
R8 33
R9 33
R10 33
R11 33
R12 33
R13 33
R14 33
R15 33
R16 33
R17 33
R18 33
R19 33
R20 33
R21 33
R22 33
R23 33
R24 33
R25 33
R26 33
R27 33
R28 33
R29 33
R30 33
R31 33
PPD[0..7]
PPD0
PPD1
PPD2
PPD3
PPD4
PPD5
PPD6
PPD7
/FAULT
PERROR
SELECT
BUSY
/ACK
/INIT
/AUTOFD
/STROBE
/SLCTIN
/PFSEN
/DOCSEN
/DREQ
/FBUSYL
/FBUSYH
/DACK
/INT0
/UARTIRQ
UARTRES
/DPRES
DIR
/SCAN
STATUS4
STATUS3
STATUS2
STATUS1
R40 51
R42 51
+5V
MCLK
R48 10K
R51 N/A
/BKOHW
/RESET
R49 N/A
R52 N/A
GND
R53 N/A
R54 100K
R55 100K
R56 100K
/TRST
TDI
TMS
TCK
TDO
U1
KS32C6100
FAULT
SELECTIN
MCLK
UCLK
CLKSEL
BKOHW
RESET
ExtMREQ
ExtMACK
ExtWaitExtMDL
TRST
RSTO
R156 100K
R155 100K
RXD
TXD
/DTR
/DSR
R154 100K
/ECS3
/ECS2
/ECS1
/ECS0
R33 33
R34 33
/RCS3
/RCS2
/RCS1
/RCS0
R35 33
SIO_RXD
SIO_TXD
R36 33
/WE0
R37 33
/WE2
R38 33
/OE
R39 33
/DWE
R41 33
R43 N/A
/RAS0
/RAS1
R44 33
R45 33
R46 33
R47 33
/CAS0
/CAS1
/CAS2
/CAS3
VCLK0
VCLK1
R50 N/A
VCLK
60MHz
R157 100K
GND
ENGPRQ
ENGHSYNC
ENGREADY
CPUPRINT
VIDEO_OUT
CONCLK
CPBSY
CEMSG
CEBSY
CPMSG
CPUSYNC
TMODE
/PSYNCRQ
/HSYNC
/RDY
/PRINT
VDO
CCLK
/CBSY
/EMSG
/EBSY
/CMSG
R57 33
R58 33
R59 33
R60 33
R61 33
R62 33
R63 33
R64 33
R65 33
R66 33
R67 33
R68 33
R69 33
R70 33
R71 33
R72 33
R73 33
R74 33
R75 33
R76 33
R77 33
R78 33
R79 33
R80 33
R81 33
R82 33
R83 33
R84 33
R85 33
R86 33
R87 33
R88 33
DATA[0..31]

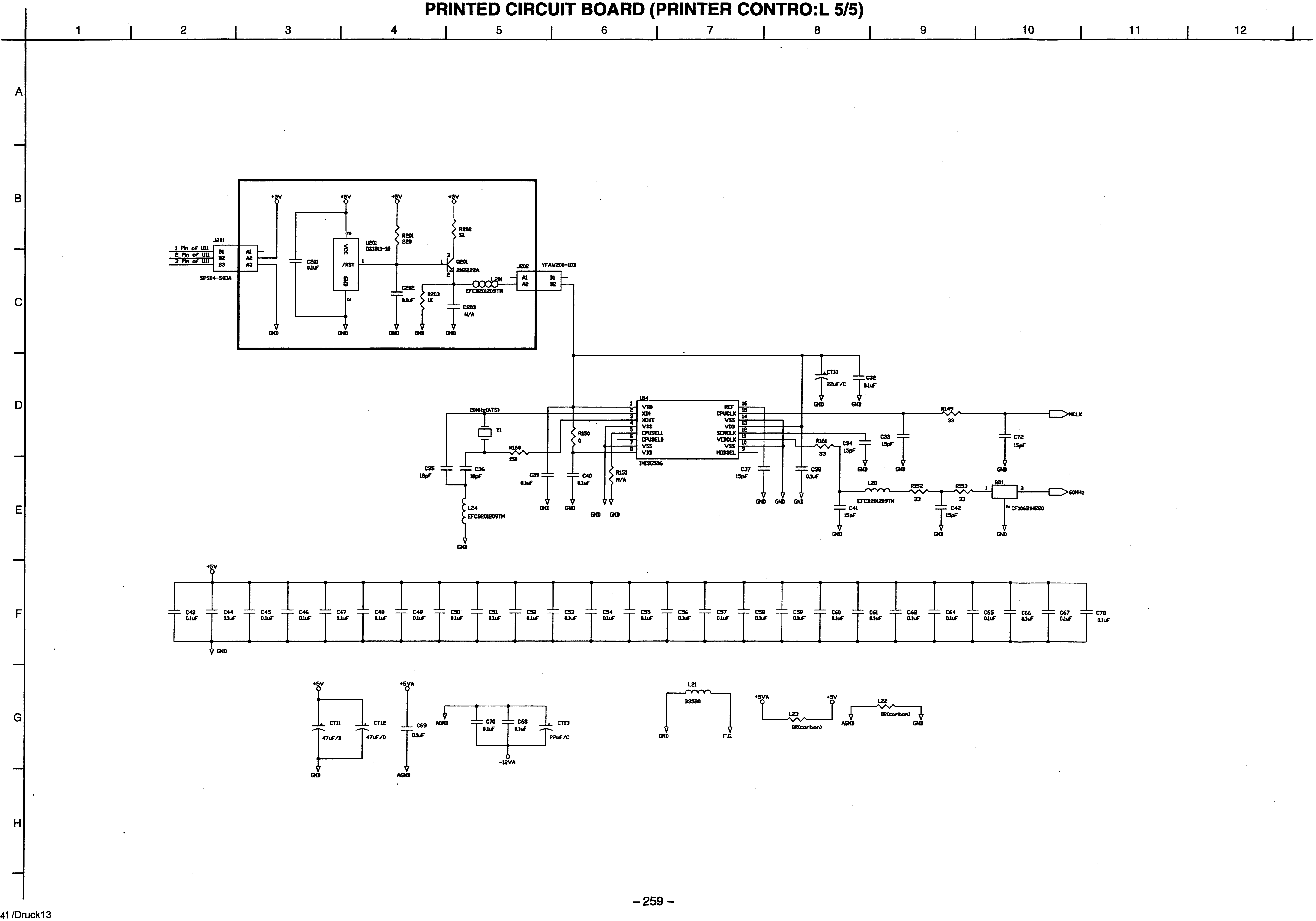
SCHEMATIC DIAGRAM (PRINTER CONTROL 3/5)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
ADDR[0..6]
DATA[0..7]
U8
N/A
U9
AK8414
U10
NJM3000
U11
N/A
U12A
U12B
TL072
Q1
2N2222A
R94 10K
R95 10K
R163 47K
R164 47K
R165 47K
R166 47K
R167 47K
R168 47K
R90 3.9
R91 3.9
R92 3.9
R93 3.9
R96 33
R97 10K
R98 4.7K
R99 1K
R100 47K
R103 N/A
R104 5.6K 1%
R105 3.9K 1%
R158 220
R169 68
R170 68
C1 0.1uF
C2 0.1uF
C3 0.1uF
C4 0.1uF
C71 220pF
C73 47pF
C75 0.1uF
C77 0.1uF
C101 1uF
C102 10pF
CT1 22uF/C
CT2 22uF/C
CT3 22uF/C
CT4 1.0uF/A
CT5 1.0uF/A
CT6 1.0uF/A
CT7 1.0uF/A
CT8 1.0uF/A
CT9 1.0uF/A
L25 CIM21J102
L26 CIM21J102
+5V
+5VA
-12VA
GND
AGND
/LEDC
SP
RCLK
/SVDO
/DACK
/DREQ
LTRIG
IPCLK
/RESET
/IPCS
VCLK
/HSYNC
/ECS0
/ECS1
/OE
/WE0
/INT0
LFEED
60MHz
/FRESET

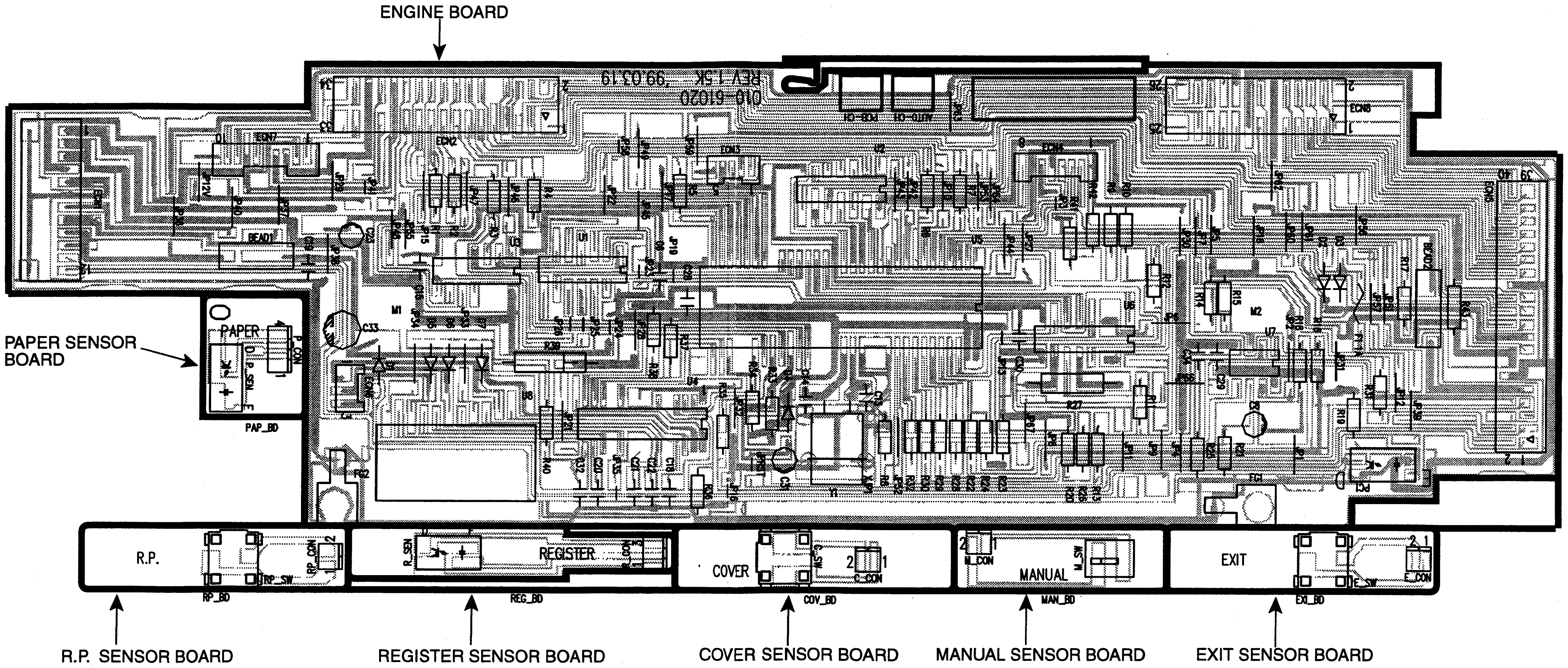
PRINTED CIRCUIT BOARD (PRINTER CONTROL 4/5)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
+5V
D1
1N5817
C5
0.1uF
GND
PPD[0..7]
R162
N/A
PPD0
PPD1
PPD2
PPD3
PPD4
PPD5
PPD6
PPD7
U13
74HCT245
DIR
R123
4.7K
/STROBE
R106
R107
R108
R109
R110
R111
R112
R113
R114
R115
R116
R117
R118
R119
1K
/ACK
BUSY
PERROR
SELECT
/AUTOFD
D5
D6
D7
D8
D9
D10
D11
D12
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
D13
D14
D15
D16
D17
D18
5.6V
1000pF
EFCB201209TM
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L15
RC10HAK-36RI-LW(01)
J4
F.G.
R124
1K
L14
L16
L17
/INIT
/FAULT
/SLCTIN
R120
R121
R122
C6
C7
R159
100K
C8
100pF
D2
D3
D4
SIO_RXD
SIO_TXD
/OPRES
J3
N/A
OPE
/TRST
TDI
TMS
TCK
TDO
J2
JTAG
STATUS3
STATUS1
/DTR
TXD
/FRESET
/PFSEN
/PRINT
/HSYNC
/SCAN
/CBSY
/CMSG
CCLK
R126
R128
R130
R132
R134
R136
R138
R139
R141
R143
R145
220
J5
A1-34PA-2.54DS
-12VA
R125
4.7K
R127
R129
R131
R133
R135
R137
R140
R142
R144
R146
STATUS4
STATUS2
/DSR
RXD
/DOCSEN
/PSYNCRQ
VDO
LFEED
/EBSY
/EMSG
/RDY
/SVDO
SP
C25
220pF
C26
270pF
AGND
/LEDC
C27
0.01uF
C28
C29
C30
C31
R147
R148
33
L18
RCLK
C23
15pF
C24

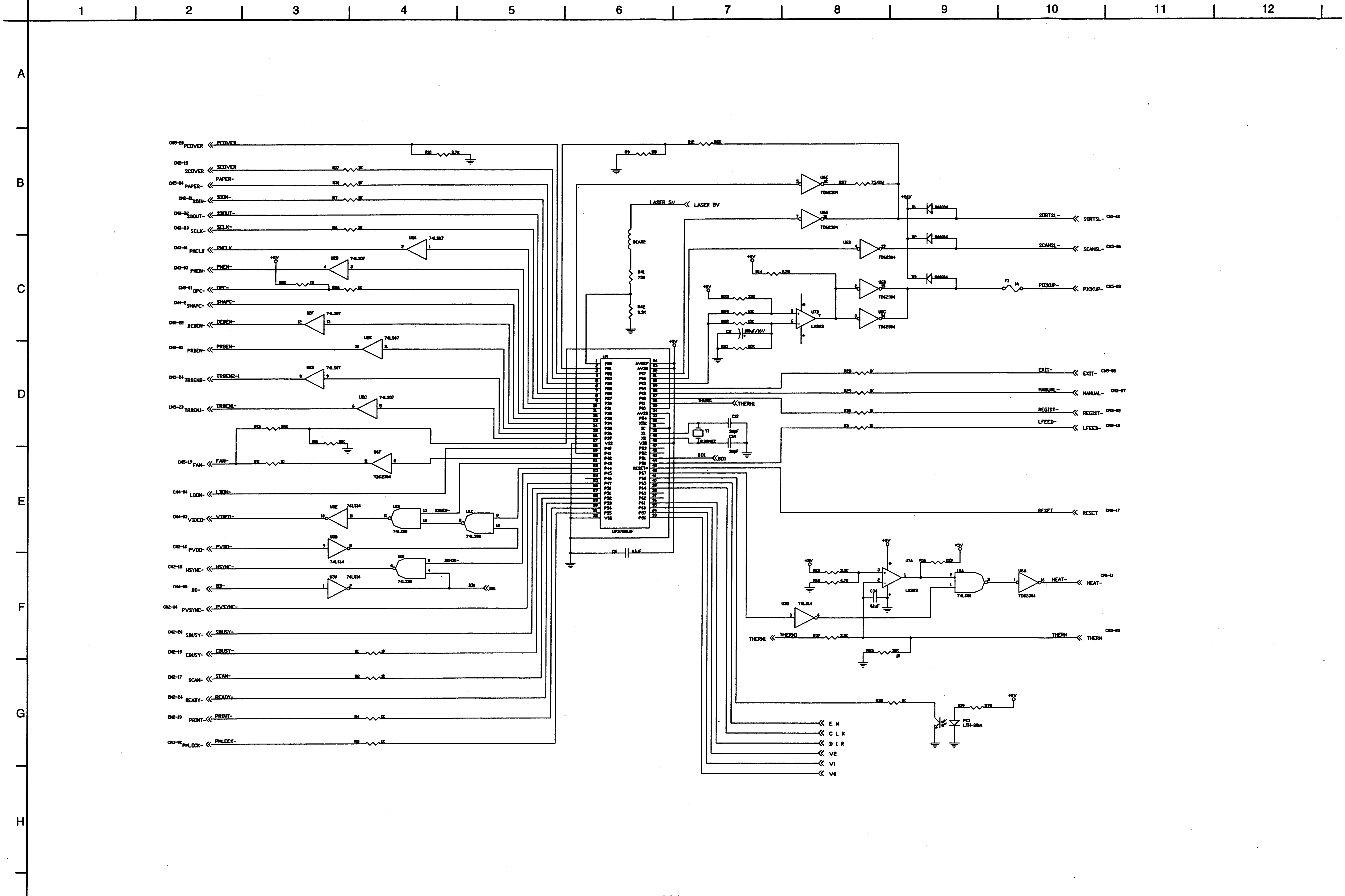
PRINTED CIRCUIT BOARD (PRINTER CONTRO:L 5/5)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
1 Pin of U11
2 Pin of U11
3 Pin of U11
J201
B1
B2
B3
A1
A2
A3
SPS04-S03A
+5V
C201
0.1uF
VCC
/RST
GND
U201
DS1811-10
R201
220
C202
0.1uF
R202
12
Q201
2N2222A
R203
1K
C203
N/A
L201
EFCB201209TM
J202
A1
A2
B1
B2
YFAV200-103
GND
CT10
22uF/C
C32
0.1uF
U14
VDD
XIN
XOUT
VSS
CPUSEL1
CPUSEL0
VSS
VDD
REF
CPUCLK
VSS
VDD
SCNCLK
VIDCLK
VSS
MODSEL
IMISG536
20MHz(ATS)
Y1
R160
150
R150
0
R151
N/A
C35
18pF
C36
18pF
L24
EFCB201209TM
C39
0.1uF
C40
0.1uF
C37
15pF
C38
0.1uF
R149
33
MCLK
C72
15pF
R161
33
C34
15pF
C33
15pF
L20
EFCB201209TM
R152
33
R153
33
BD1
CF1068H220
60MHz
C41
15pF
C42
15pF
C43 0.1uF
C44 0.1uF
C45 0.1uF
C46 0.1uF
C47 0.1uF
C48 0.1uF
C49 0.1uF
C50 0.1uF
C51 0.1uF
C52 0.1uF
C53 0.1uF
C54 0.1uF
C55 0.1uF
C56 0.1uF
C57 0.1uF
C58 0.1uF
C59 0.1uF
C60 0.1uF
C61 0.1uF
C62 0.1uF
C64 0.1uF
C65 0.1uF
C66 0.1uF
C67 0.1uF
C78 0.1uF
CT11
47uF/D
CT12
47uF/D
+5VA
C69
0.1uF
AGND
C70
0.1uF
C68
0.1uF
CT13
22uF/C
-12VA
L21
BS580
F.G
L23
0R(carbon)
L22
0R(carbon)

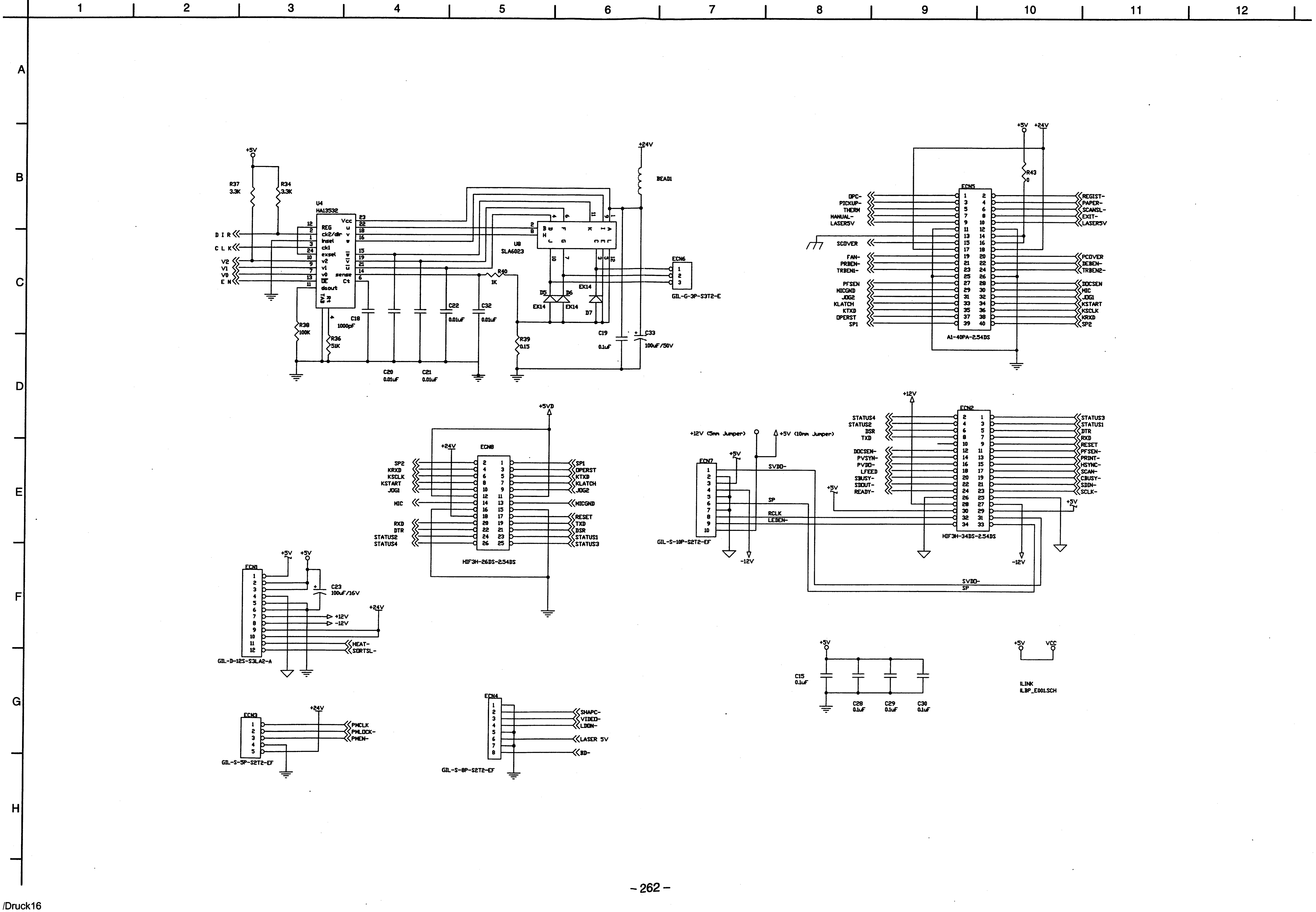
PRINTED CIRCUIT BOARD (ENGINE/SENSORS)


ENGINE BOARD
PAPER SENSOR BOARD
PAPER
PAP_BD
R.P.
RP_BD
REGISTER
REG_BD
COVER
COV_BD
MANUAL
MAN_BD
EXIT
EXI_BD
R.P. SENSOR BOARD
REGISTER SENSOR BOARD
COVER SENSOR BOARD
MANUAL SENSOR BOARD
EXIT SENSOR BOARD

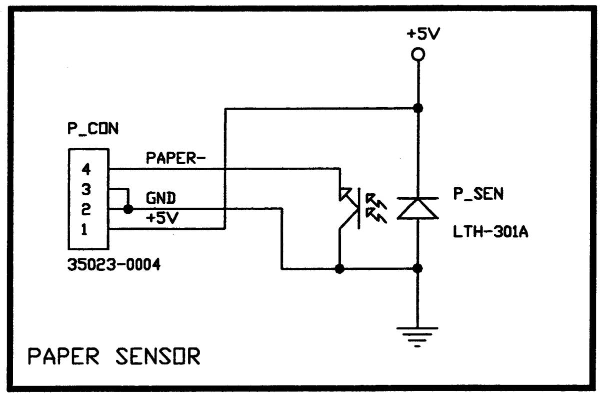
SCHEMATIC DIAGRAM (ENGINE 1/2)

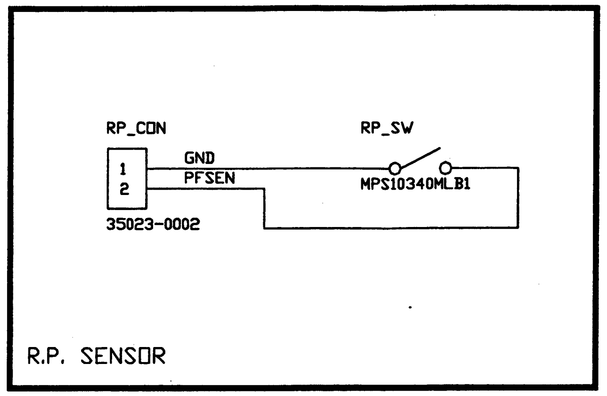

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
PCOVER
SCOVER
PAPER-
SDIN-
SDOUT-
SCLK-
PMCLK
PMEN-
DPC-
SHAPC-
DEBEN-
PRBEN-
TRBEN2-
TRBEN1-
FAN-
LDON-
VIDEO-
PVDO-
HSYNC-
BD-
PVSYNC-
SBUSY-
CBUSY-
SCAN-
READY-
PRINT-
PMLOCK-
LASER 5V
SORTSL-
SCANSL-
PICKUP-
EXIT-
MANUAL-
REGIST-
LFEED-
RESET
HEAT-
THERM
THERM1
BD1
EN
CLK
DIR
V2
V1
V0
74LS07
74LS14
74LS00
TD62304
LM393
+5V
+24V

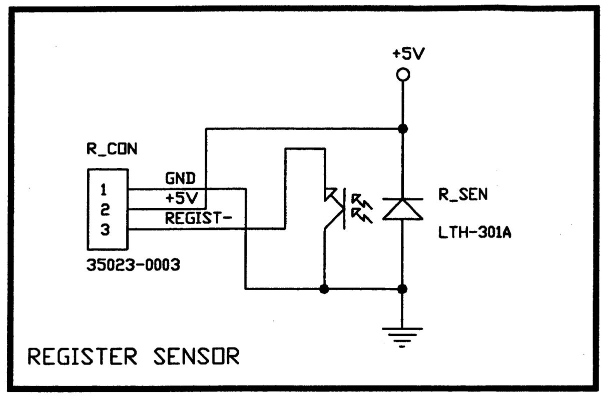
SCHEMATIC DIAGRAM (ENGINE 2/2)

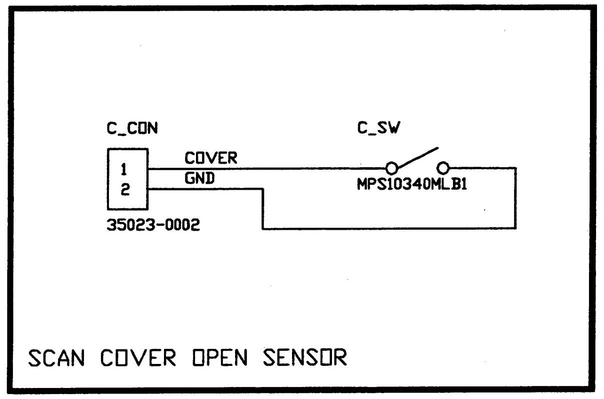

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
+5V
R37
3.3K
R34
3.3K
U4
HA13532
REG
ck2/dir
insel
ck1
exsel
v2
v1
v0
DE
daout
TAB
Rt
Vcc
u
v
w
sense
Ct
D I R
C L K
V2
V1
V0
E N
R38
100K
R36
51K
C18
1000pF
C20
0.01uF
C21
0.01uF
C22
0.01uF
C32
0.01uF
R40
1K
R39
0.15
U8
SLA6023
+24V
BEAD1
D5
D6
D7
EK14
C19
0.1uF
C33
100uF/50V
ECN6
GIL-G-3P-S3T2-E
+5V
+24V
R43
0
ECN5
DPC-
PICKUP-
THERM
MANUAL-
LASER5V
SCOVER
FAN-
PRBEN-
TRBEN1-
PFSEN
MICGND
JOG2
KLATCH
KTXD
OPERST
SP1
REGIST-
PAPER-
SCANSL-
EXIT-
LASER5V
PCOVER
DEBEN-
TRBEN2-
DOCSEN
MIC
JOG1
KSTART
KSCLK
KRXD
SP2
A1-40PA-2.54DS
+5VD
+24V
ECN8
SP2
KRXD
KSCLK
KSTART
JOG1
MIC
RXD
DTR
STATUS2
STATUS4
SP1
OPERST
KTXD
KLATCH
JOG2
MICGND
RESET
TXD
DSR
STATUS1
STATUS3
HIF3H-26DS-2.54DS
+12V (5mm Jumper)
+5V (10mm Jumper)
ECN7
+5V
SVDO-
SP
RCLK
LEDEN-
GIL-S-10P-S2T2-EF
-12V
+12V
ECN2
STATUS4
STATUS2
DSR
TXD
DOCSEN-
PVSYN-
PVDO-
LFEED
SBUSY-
SDOUT-
READY-
STATUS3
STATUS1
DTR
RXD
RESET
PFSEN-
PRINT-
HSYNC-
SCAN-
CBUSY-
SDIN-
SCLK-
HIF3H-34DS-2.54DS
-12V
SVDO-
SP
ECN1
+5V
C23
100uF/16V
+24V
+12V
-12V
HEAT-
SORTSL-
GIL-D-12S-S3LA2-A
ECN3
+24V
PMCLK
PMLOCK-
PMEN-
GIL-S-5P-S2T2-EF
ECN4
SHAPC-
VIDEO-
LDON-
LASER 5V
BD-
GIL-S-8P-S2T2-EF
+5V
C15
0.1uF
C28
0.1uF
C29
0.1uF
C30
0.1uF
+5V
VCC
ILINK
ILBP_E001.SCH

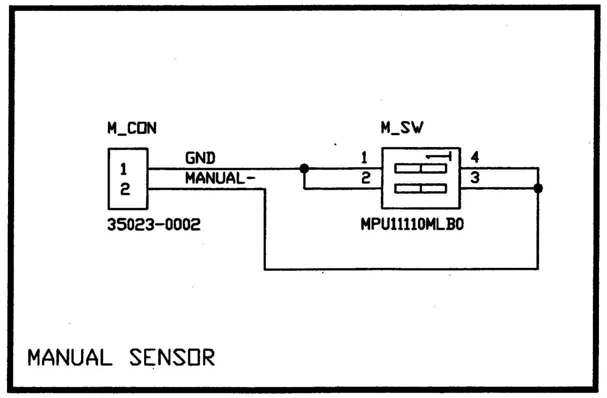
SCHEMATIC DIAGRAM (SENSORS)

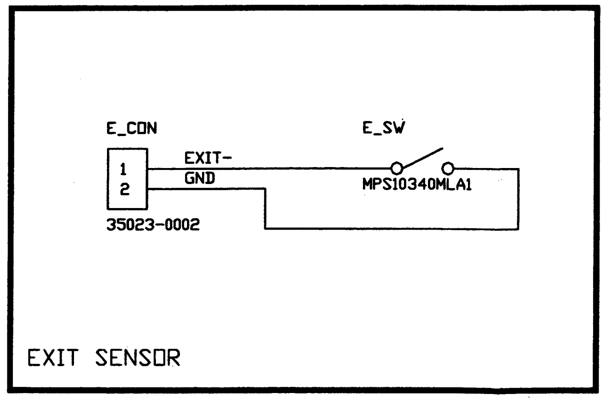

+5V
P_CON
PAPER-
4
3
2
1
GND
+5V
35023-0004
P_SEN
LTH-301A
PAPER SENSOR


RP_CON
RP_SW
1
2
GND
PFSEN
MPS10340MLB1
35023-0002
R.P. SENSOR


+5V
R_CON
1
2
3
GND
+5V
REGIST-
35023-0003
R_SEN
LTH-301A
REGISTER SENSOR

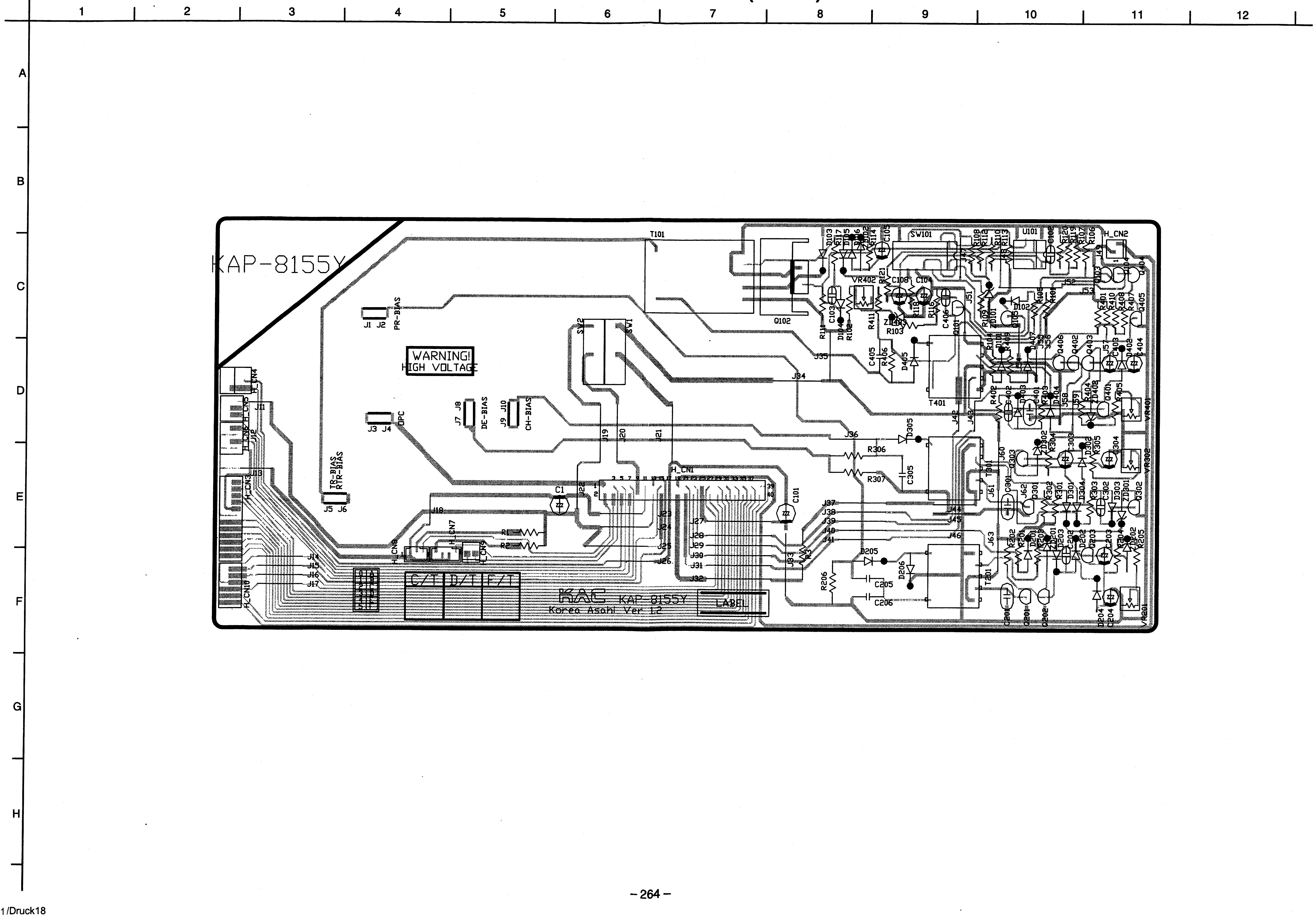

C_CON
C_SW
1
2
COVER
GND
MPS10340MLB1
35023-0002
SCAN COVER OPEN SENSOR


M_CON
M_SW
1
2
GND
MANUAL-
1
2
4
3
35023-0002
MPU11110MLB0
MANUAL SENSOR


E_CON
E_SW
1
2
EXIT-
GND
MPS10340MLA1
35023-0002
EXIT SENSOR

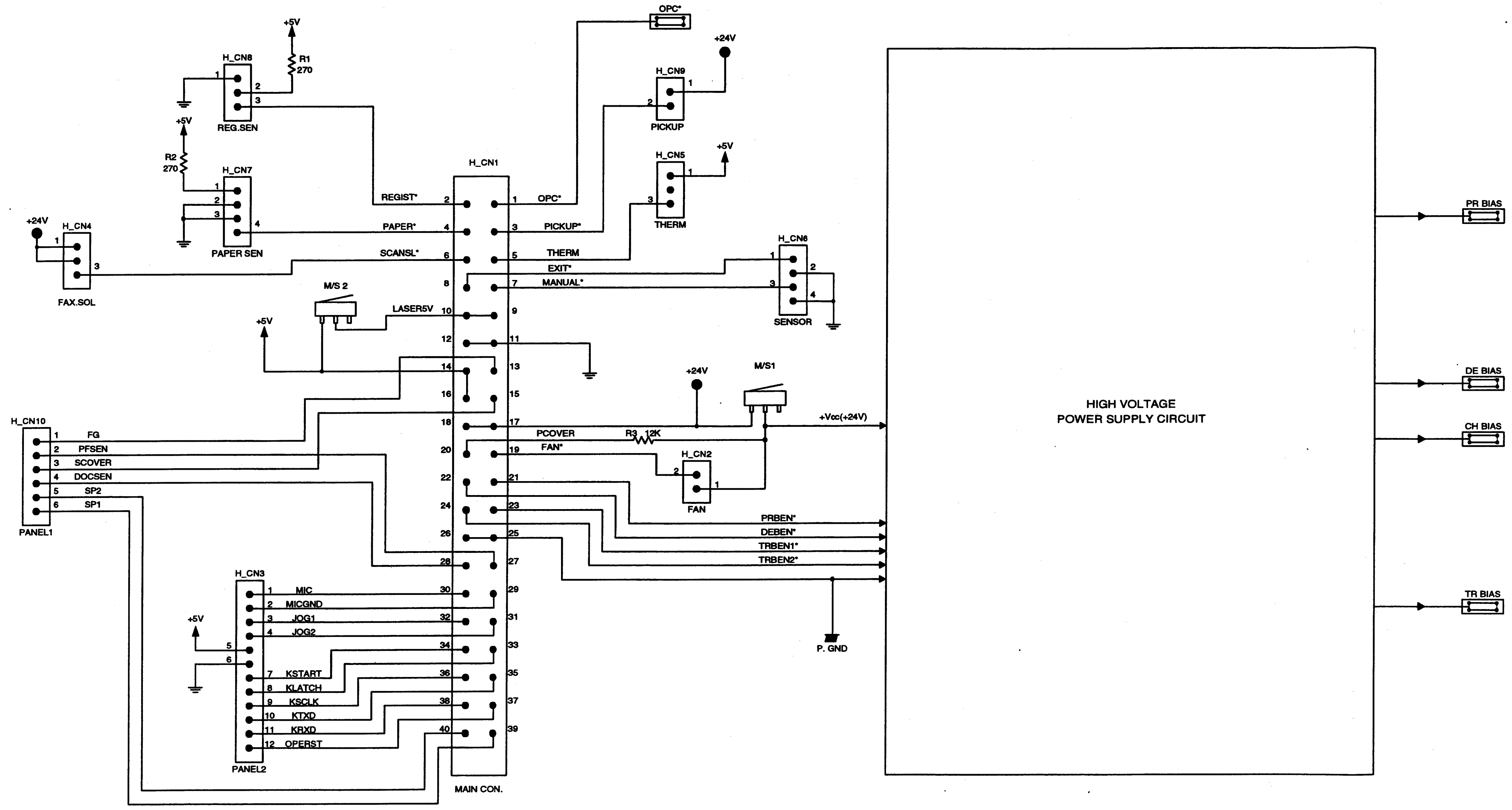
(See page 260)

PRINTED CIRCUIT BOARD (H.V.P.S)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
KAP-8155Y
WARNING!
HIGH VOLTAGE
J1 J2 PR-BIAS
J3 J4 OPC
J5 J6 TR-BIAS RTR-BIAS
J7 J8 DE-BIAS
J9 J10 CH-BIAS
SW2
SW1
T101
Q102
J34
J35
J36
J19
J20
J21
J22
J18
J23
J24
J25
J26
J27
J28
J29
J30
J31
J32
J33
J37
J38
J39
J40
J41
J44
J45
J46
H_CN1
H_CN2
H_CN3
H_CN4
H_CN5
H_CN6
H_CN7
H_CN8
H_CN9
H_CN10
J11
J12
J13
J14
J15
J16
J17
C1
C101
R1
R2
R3
R306
R307
C305
D305
D205
D206
R206
C205
C206
T201
T301
T401
SW101
U101
VR401
VR302
VR201
VR402
C/T
D/T
F/T
KAC KAP-8155Y
Korea Asahi Ver 1.2
LABEL

KX-FLM600G **KX-FLM600G**

SCHEMATIC DIAGRAM (H.V.P.S 1/2)

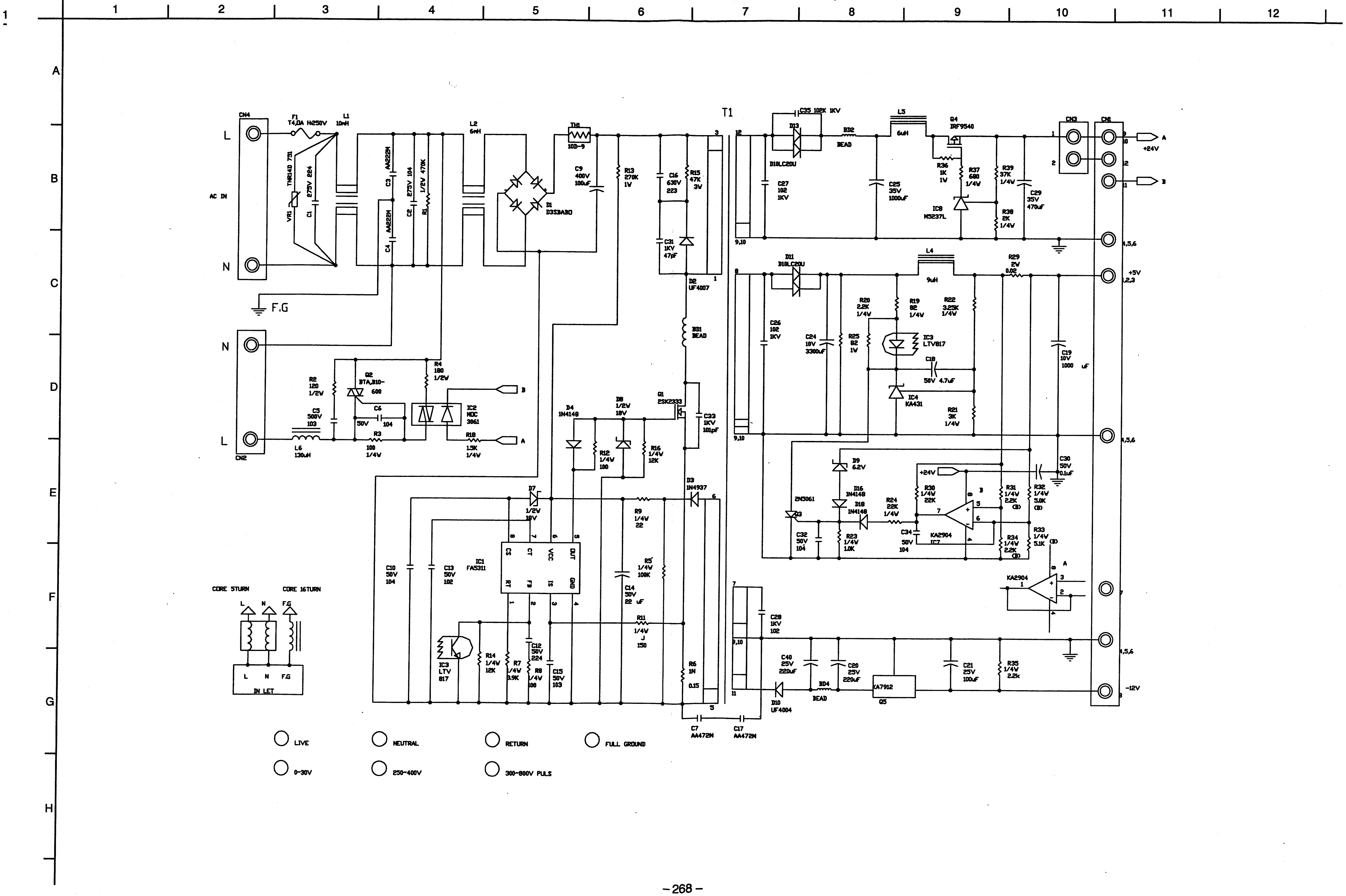

OPC*
+24V
+5V
R1
270
H_CN8
REG.SEN
R2
270
H_CN7
PAPER SEN
H_CN9
PICKUP
H_CN5
THERM
H_CN1
REGIST*
PAPER*
SCANSL*
LASER5V
OPC*
PICKUP*
THERM
EXIT*
MANUAL*
H_CN6
SENSOR
H_CN4
FAX.SOL
M/S 2
M/S1
PCOVER
FAN*
R3 12K
H_CN2
FAN
+Vcc(+24V)
PRBEN*
DEBEN*
TRBEN1*
TRBEN2*
P. GND
H_CN10
FG
PFSEN
SCOVER
DOCSEN
SP2
SP1
PANEL1
H_CN3
MIC
MICGND
JOG1
JOG2
KSTART
KLATCH
KSCLK
KTXD
KRXD
OPERST
PANEL2
MAIN CON.
HIGH VOLTAGE
POWER SUPPLY CIRCUIT
PR BIAS
DE BIAS
CH BIAS
TR BIAS

Note :

H_CN1 :	HIF3H-40DA-2.54DSA / HIROSE	H_CN6 :	GIL-S-4P-S2L2-EF / LGC	M/S 1, M/S 2 :	MICRO SWITCH
H_CN2 :	GIL-G-2P-S3T2-E / LGC	H_CN7 :	GIL-S-3P-S2T2-EF / LGC	OPC*, PR BIAS, DE BIAS, CH BIAS, TR BIAS :	JUMPER 2EA
H_CN3 :	GIL-S-12P-S2L2-EF / LGC	H_CN8 :	GIL-S-4P-S2T2-EF / LGC		
H_CN4 :	GIL-G-3P-S3L2-E / LGC	H_CN9 :	GIL-G-2P-S3T2-E / LGC		
H_CN5 :	GIL-S-3P-S2L2-EF / LGC	H_CN10 :	GIL-S-6P-S2L2-EF / LGC		

KX-FLM600G **KX-FLM600G**

SCHEMATIC DIAGRAM (S.M.P.S)


1
2
3
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7
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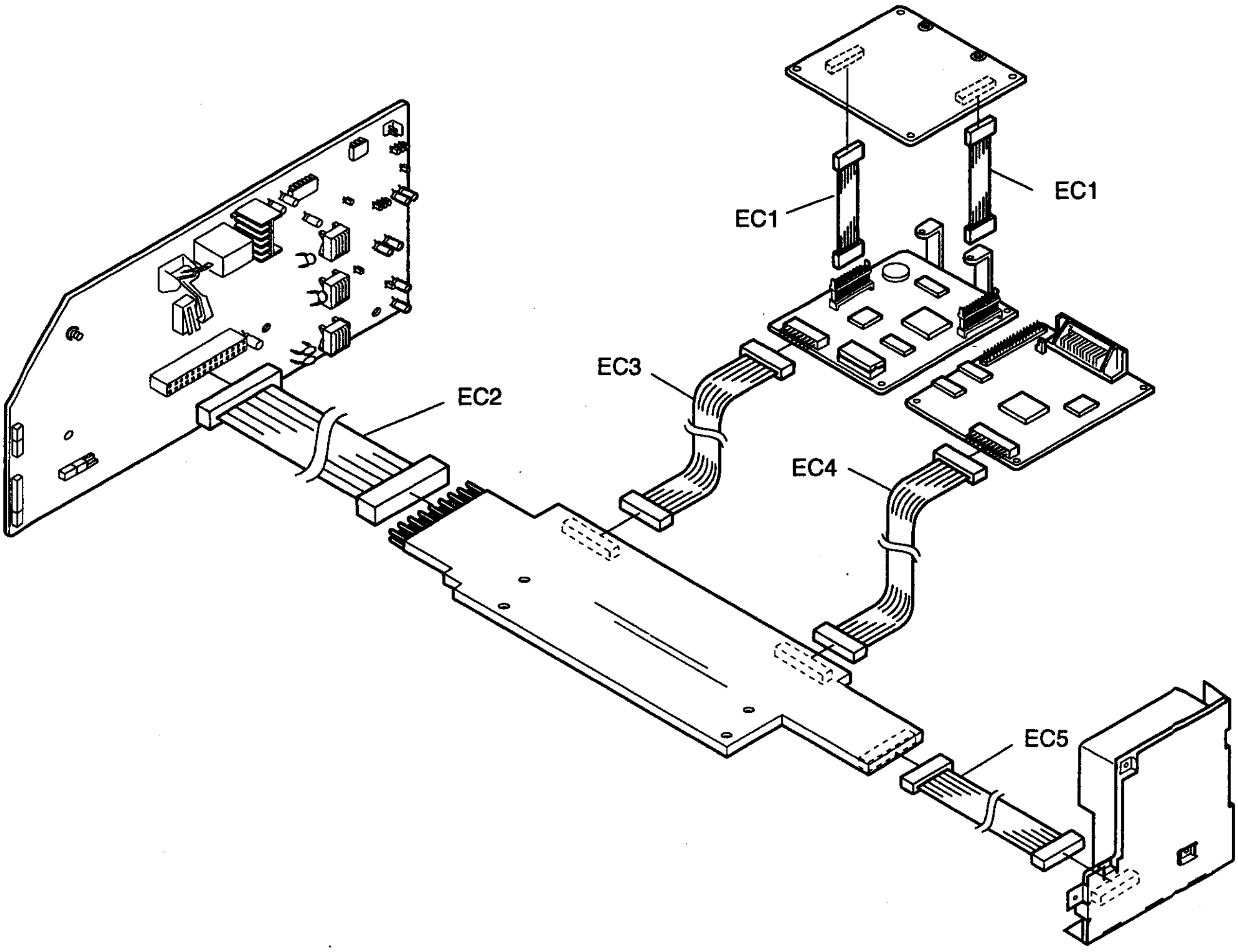
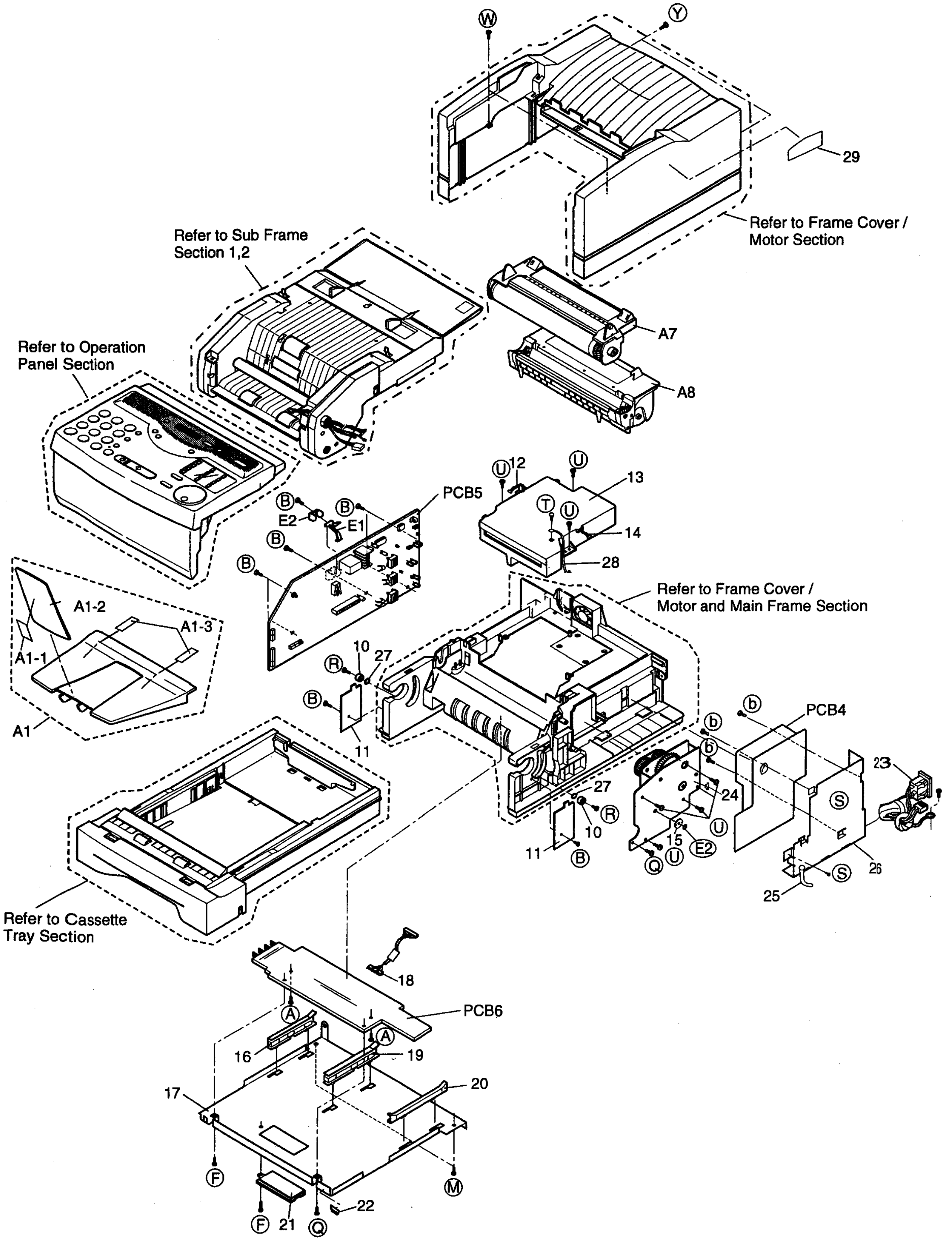
9
10
11
12
A
B
C
D
E
F
G
H
CN4
L
N
AC IN
F1
T4.0A H250V
L1
10mH
TNR14D 751
VR1
275V 224
C1
AA222M
C3
AA222M
C4
275V 104
C2
1/2V 470K
R1
L2
6mH
TH1
10D-9
D1
D3SBA10
C9
400V
100uF
R13
270K
1W
C16
630V
223
R15
47K
3W
C31
1KV
47pF
D2
UF4007
BD1
BEAD
T1
F.G
CN2
N
L
R2
120
1/2W
Q2
BTA,B10-
600
C5
500V
103
C6
50V
104
R3
100
1/4W
L6
130uH
R4
180
1/2W
IC2
MOC
3061
R18
1.5K
1/4W
B
A
D4
1N4148
D8
1/2W
18V
R12
1/4W
100
R16
1/4W
12K
Q1
2SK2333
C33
1KV
101pF
D3
1N4937
D7
1/2W
18V
R9
1/4W
22
R5
1/4W
100K
C14
50V
22 uF
R11
1/4W
J
150
R6
1N
0.15
C10
50V
104
C13
50V
102
IC1
FA5311
CS
CT
VCC
OUT
RT
FB
IS
GND
IC3
LTV
817
R14
1/4W
12K
R7
1/4W
3.9K
C12
50V
224
R8
1/4W
100
C15
50V
103
C7
AA472M
C17
AA472M
C35 102K 1KV
D13
D10LC20U
C27
102
1KV
BD2
BEAD
L5
6uH
C25
35V
1000uF
Q4
IRF9540
R36
1K
1W
R37
680
1/4W
IC8
M5237L
R39
37K
1/4W
R38
2K
1/4W
C29
35V
470uF
CN3
CN1
+24V
D11
D10LC20U
C26
102
1KV
C24
10V
3300uF
R25
82
1W
L4
9uH
R20
2.2K
1/4W
R19
82
1/4W
R22
3.25K
1/4W
IC3
LTV817
C18
50V 4.7uF
IC4
KA431
R21
3K
1/4W
R29
2W
0.02
C19
10V
1000 uF
+5V
D9
6.2V
2N5061
Q3
D16
1N4148
D18
1N4148
C32
50V
104
R23
1/4W
1.0K
R24
22K
1/4W
R30
1/4W
22K
C34
50V
104
KA2904
IC7
R31
1/4W
2.2K
R32
1/4W
5.0K
R34
1/4W
2.2K
R33
1/4W
5.1K
C30
50V
0.1uF
KA2904
C28
1KV
102
C40
25V
220uF
C20
25V
220uF
BD4
BEAD
D10
UF4004
KA7912
Q5
C21
25V
100uF
R35
1/4W
2.2k
-12V
4,5,6
1,2,3
CORE 5TURN
CORE 16TURN
L
N
F.G
IN LET
LIVE
NEUTRAL
RETURN
FULL GROUND
0-30V
250-400V
300-800V PULS

FICTURES AND TOOLS


EC1
EC1
EC2
EC3
EC4
EC5

CABINET,MECHANICAL AND ELECTRICAL PARTS LOCATION

1. GENERAL SECTION


Ⓦ
Ⓨ
29
Refer to Frame Cover / Motor Section
Refer to Sub Frame Section 1,2
Refer to Operation Panel Section
A7
A8
Ⓤ 12
Ⓤ
13
PCB5
Ⓑ
Ⓑ
E2
E1
Ⓑ
Ⓑ
Ⓣ
Ⓤ
14
28
Refer to Frame Cover / Motor and Main Frame Section
A1-2
A1-3
A1-1
A1
10
27
Ⓡ
Ⓑ
11
ⓑ
PCB4
ⓑ
ⓑ
23
24
27
Ⓡ
10
Ⓢ
Ⓤ
15
E2
11
Ⓑ
Ⓠ
Ⓤ
26
Ⓢ
25
Refer to Cassette Tray Section
18
PCB6
Ⓐ
Ⓐ
16
19
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17
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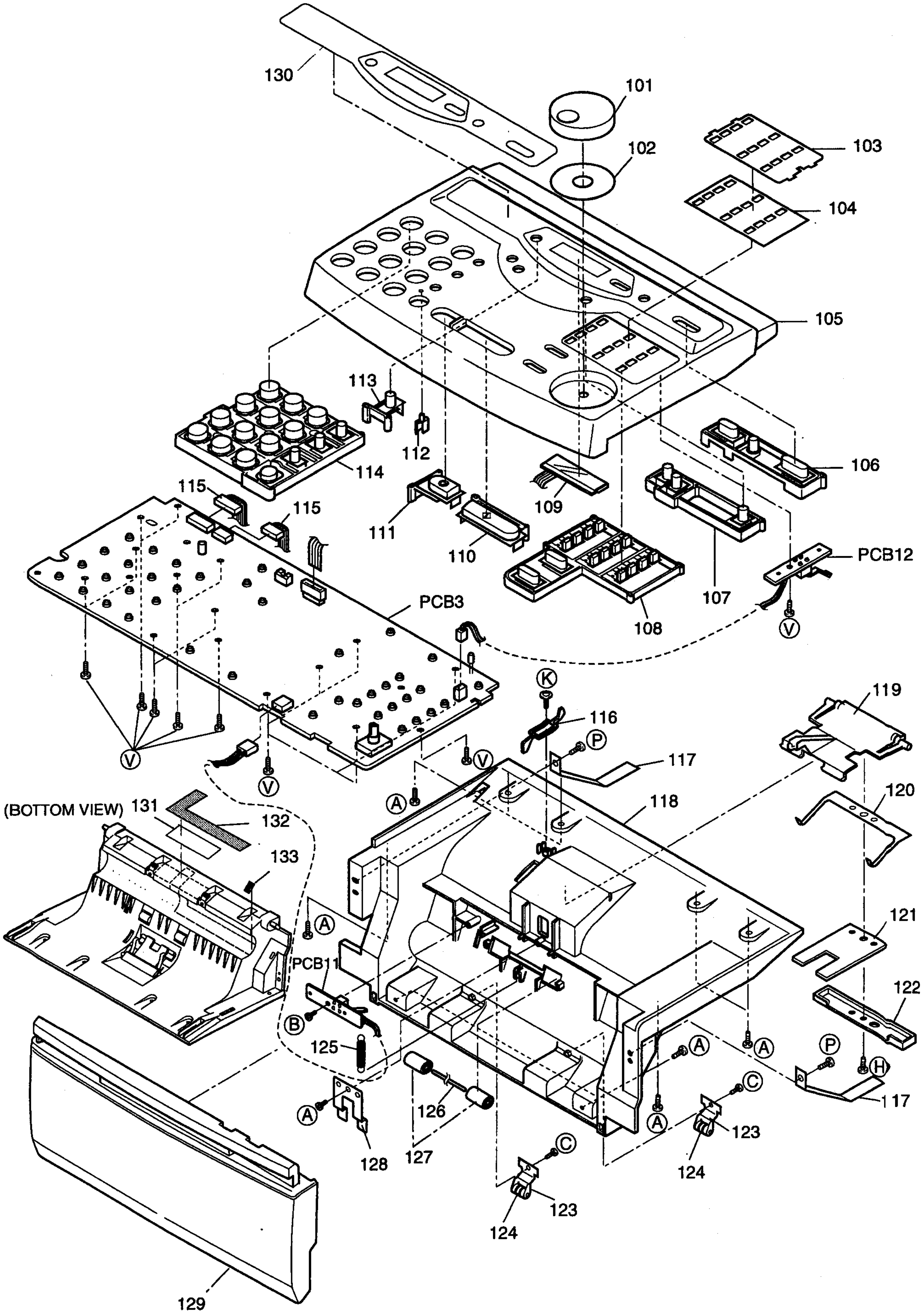
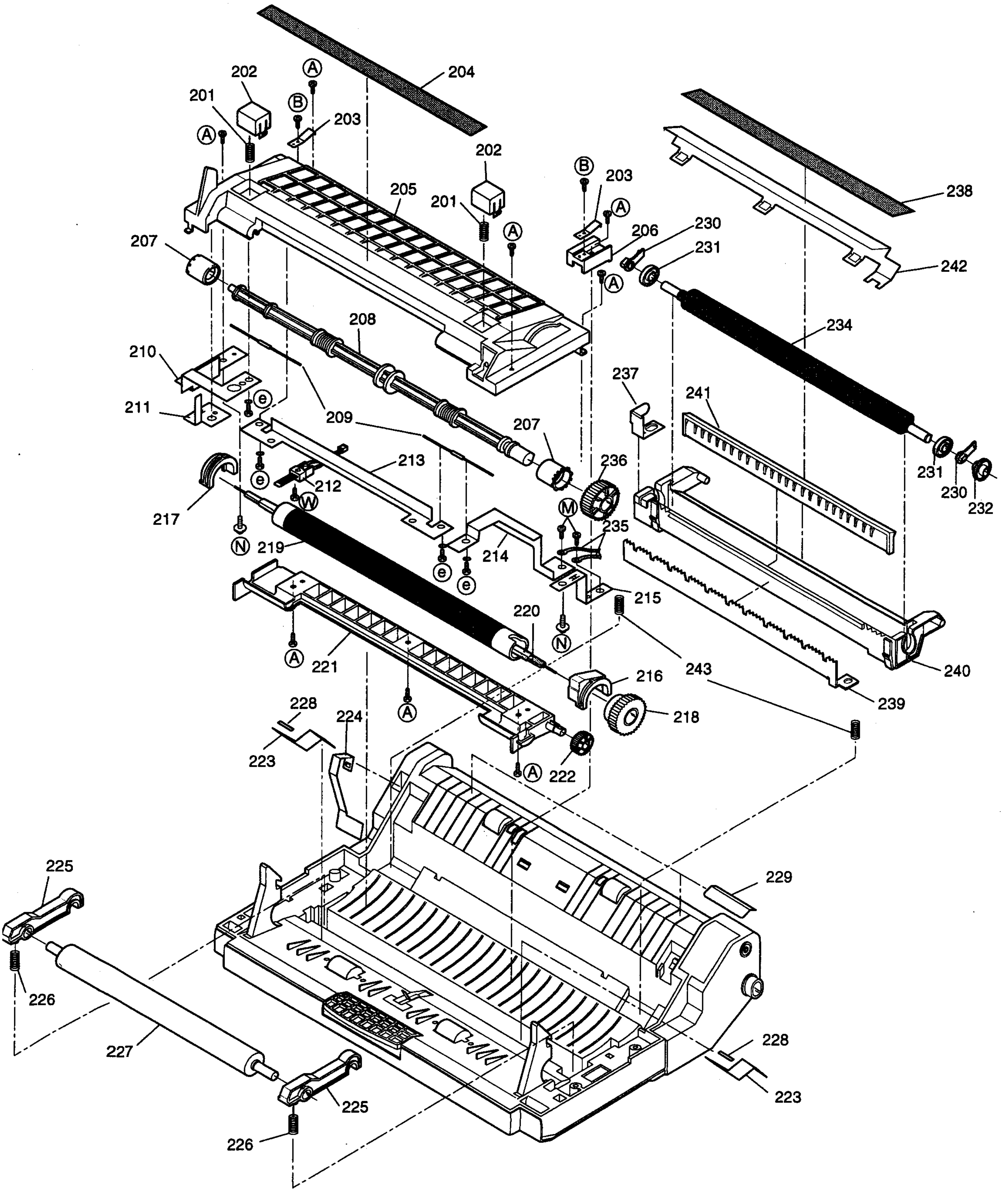
Ⓜ
22
Ⓕ
21
Ⓠ

2. OPERATION PANEL SECTION


130
101
102
103
104
105
113
112
114
106
115
115
109
111
110
107
108
PCB12
PCB3
V
K
116
119
P
117
V
V
V
A
118
120
(BOTTOM VIEW)
131
132
133
A
121
PCB11
122
B
125
A
A
P
H
C
117
A
128
126
127
123
124
C
123
124
129

KX-FLM600G

3. SUB FRAME SECTION1



202
Ⓐ
204
201
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203
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202
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203
238
205
201
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206
230
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207
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231
242
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234
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211
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236
213
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230
232
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212
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235
217
214
Ⓝ
219
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215
220
Ⓝ
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221
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216
240
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224
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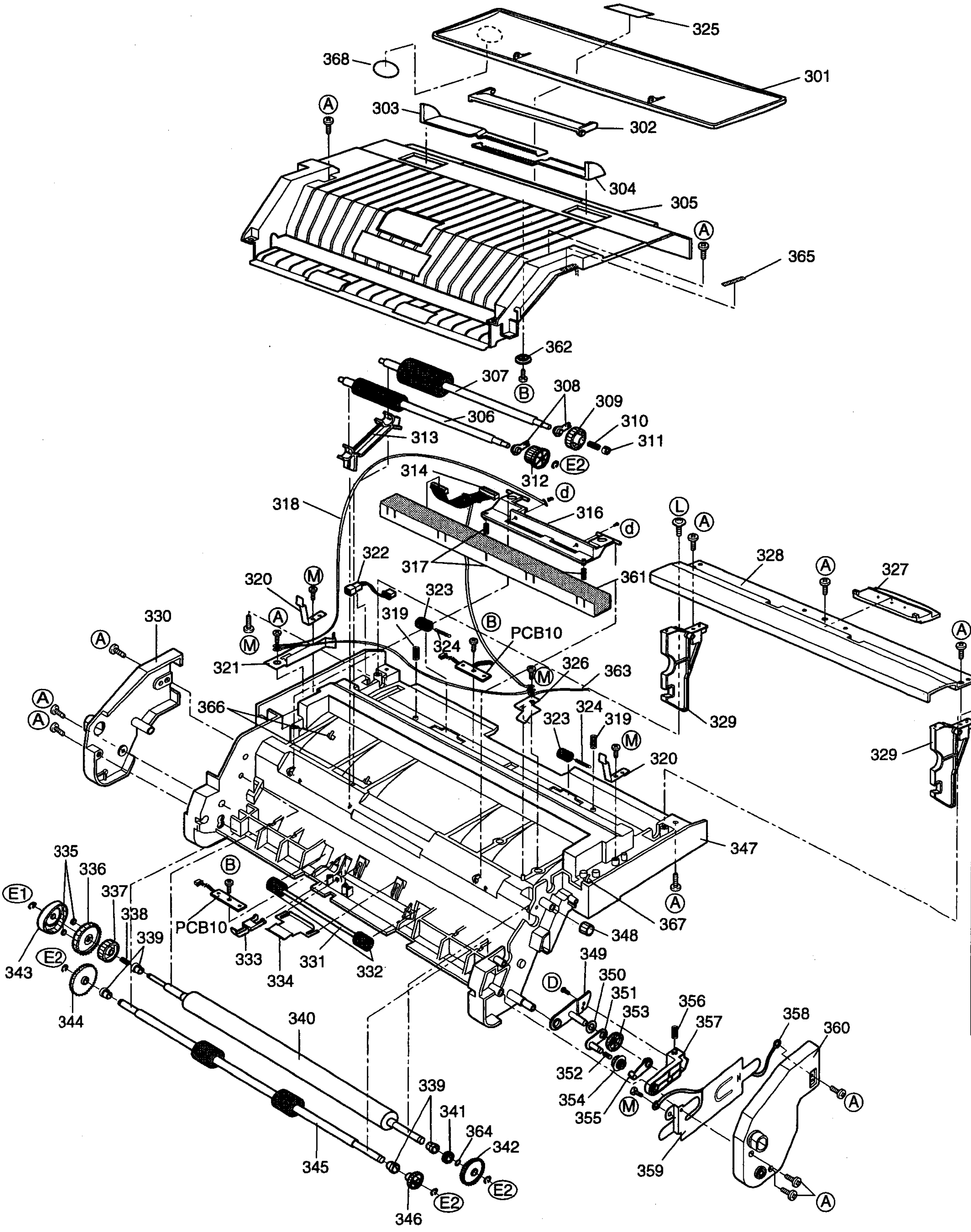
226

4. SUB FRAME SECTION2


325
301
368
302
303
Ⓐ
304
305
Ⓐ
365
362
Ⓑ
307
308
309
306
310
311
313
312
E2
314
d
316
d
318
Ⓛ
Ⓐ
328
Ⓐ
327
322
317
361
320
Ⓜ
323
Ⓐ
319
Ⓑ
PCB10
330
Ⓐ
Ⓜ
324
326
363
Ⓐ
Ⓛ
321
Ⓜ
366
Ⓐ
Ⓐ
323
324
319
Ⓜ
320
329
329
347
335
336
337
338
E1
Ⓑ
PCB10
Ⓐ
367
348
343
339
E2
333
334
331
332
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350
Ⓓ
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Ⓜ
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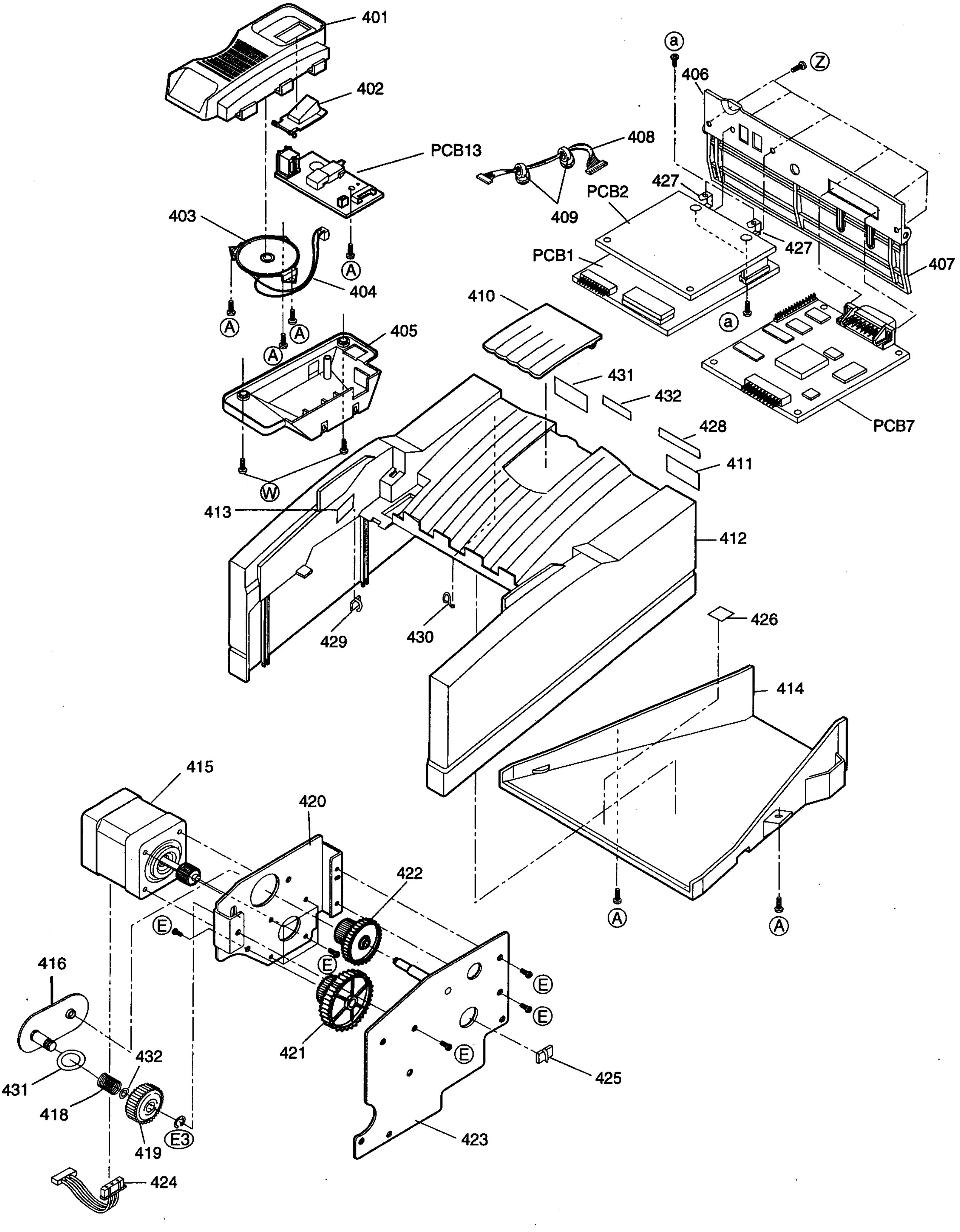
339
341
364
342
345
E2
E2
346
359
Ⓐ

5. FRAME COVER / MOTOR SECTION


401
402
PCB13
403
404
Ⓐ
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405
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413
429
430
ⓐ
406
Ⓩ
408
409
427
PCB2
427
PCB1
407
410
ⓐ
PCB7
431
432
428
411
412
426
414
Ⓐ
Ⓐ
415
420
422
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Ⓔ
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Ⓔ3
421
425
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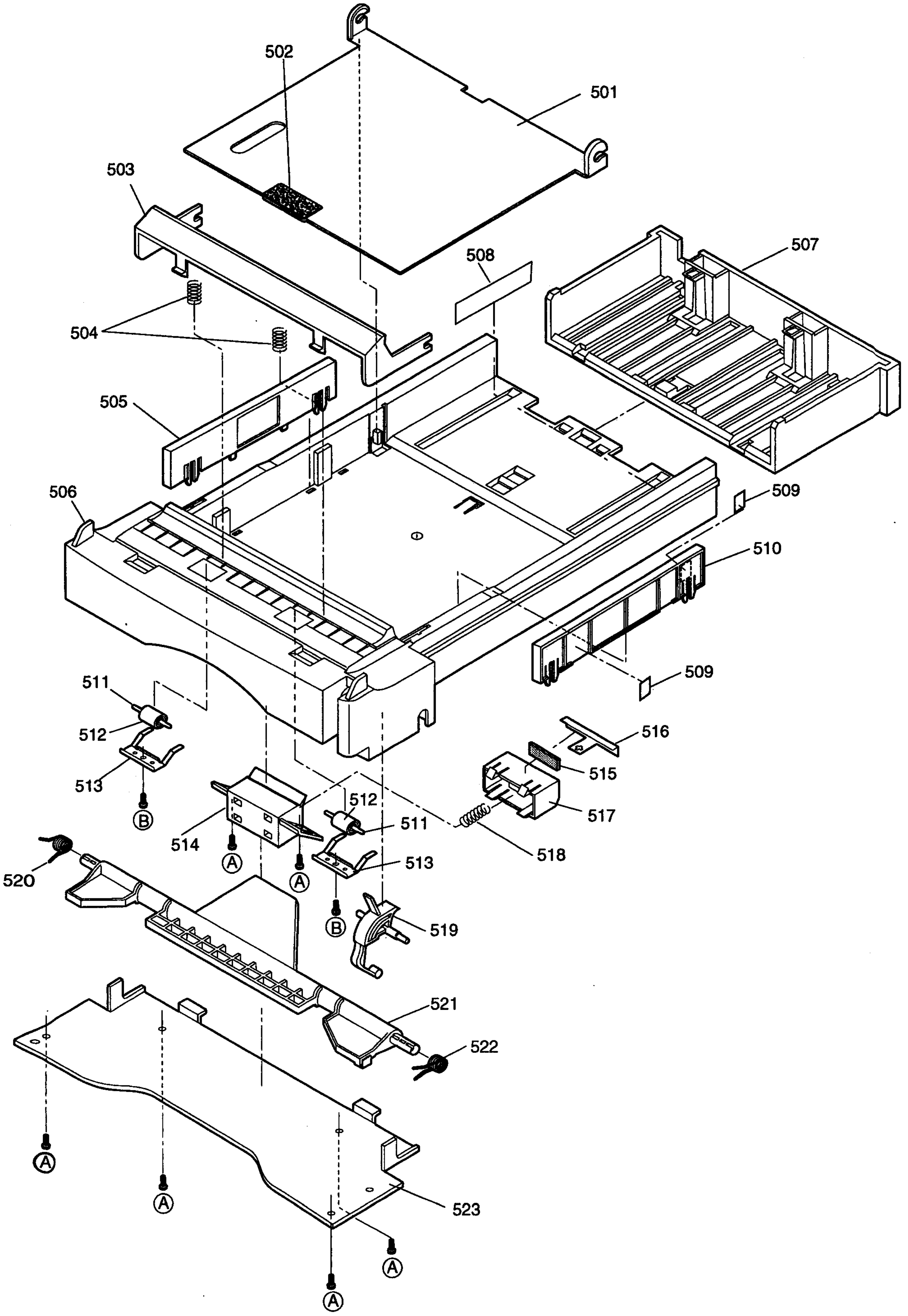
424

6. CASSETTE TRAY SECTION


502
501
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B
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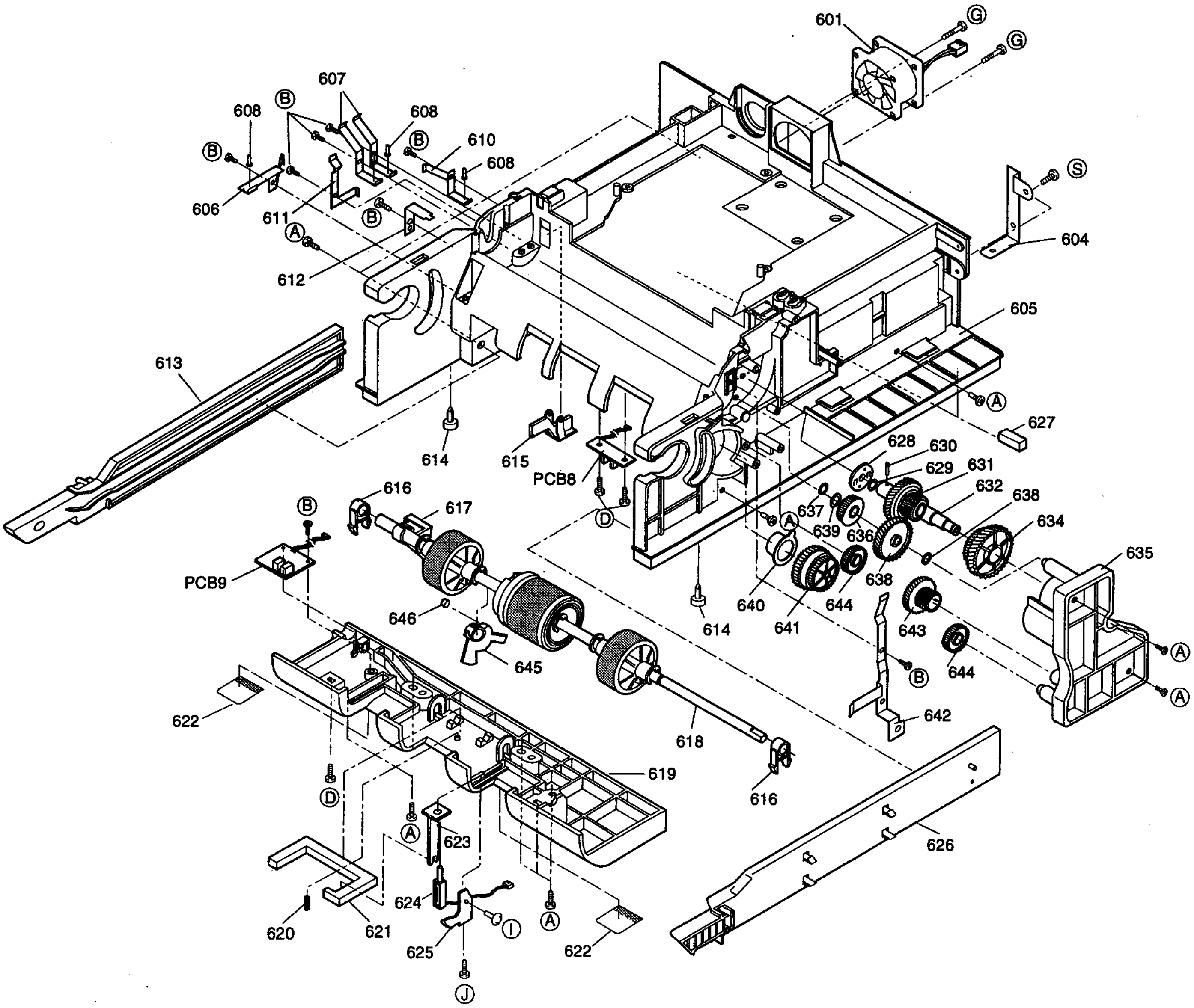
523
A
A

7. MAIN FRAME SECTION


601
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607
608
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612
Ⓢ
604
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613
Ⓐ
627
614
615
PCB8
628
630
629
631
632
638
616
617
Ⓑ
Ⓓ
637
Ⓐ
639
636
634
635
PCB9
640
644
638
646
614
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Ⓐ
644
Ⓑ
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619
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620
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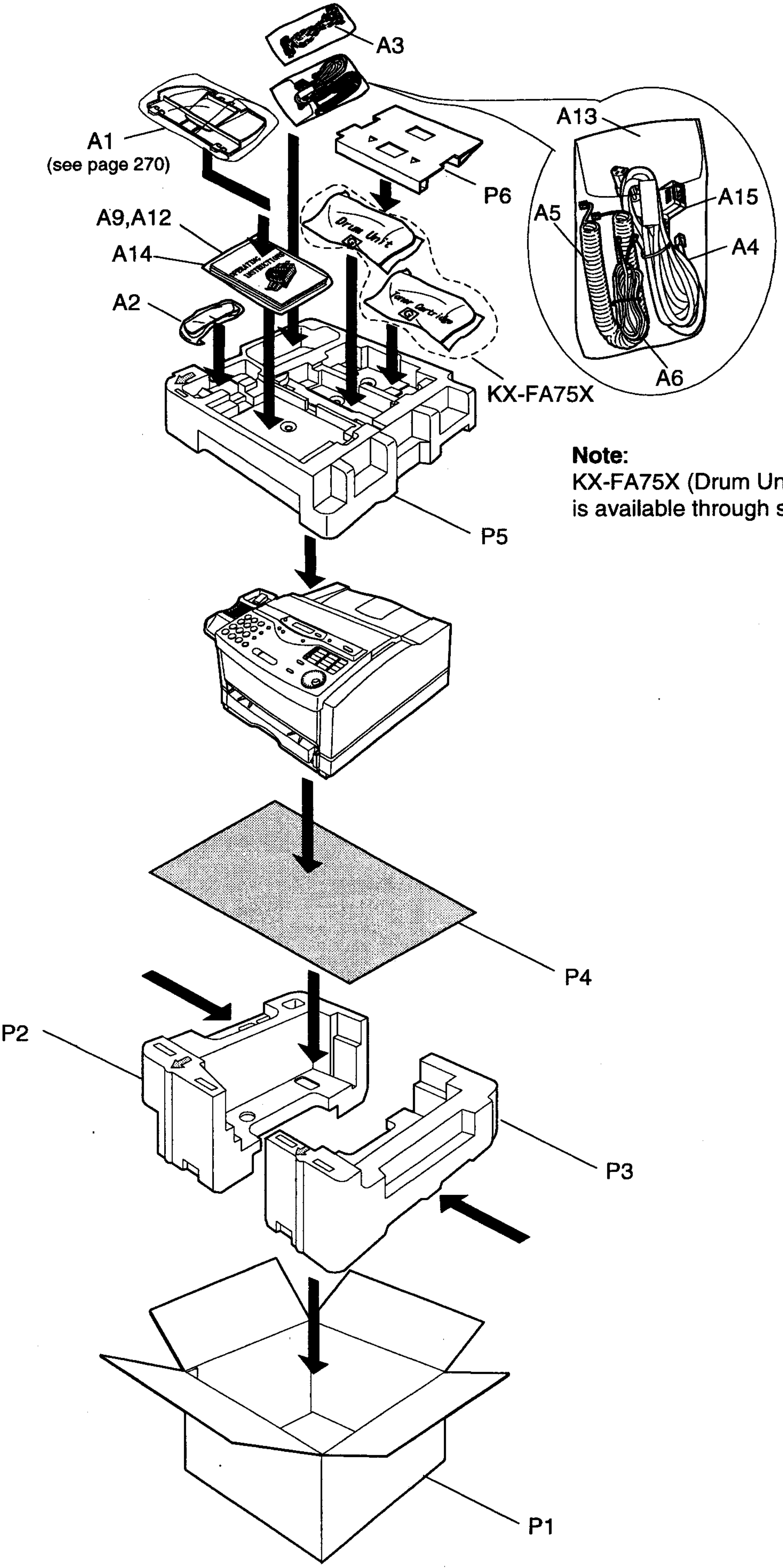
Ⓘ
622
Ⓙ

ACCESSORIES AND PACKING MATERIALS


A3
A13
A1
(see page 270)
P6
A15
A5
A9,A12
A4
A14
A2
A6
KX-FA75X
P5
P4
P2
P3
P1

Note:
KX-FA75X (Drum Unit and Toner Cartridge) is available through sales route of Panasonic.

This replacement parts list is for KX-FLM600G only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST

Model KX-FLM600G

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.
2. Important safety notice.
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified.
   All resistors are in ohms ( ) k=1000 , M=1000k
   All capacitors are in MICRO FARADS(μF) P= μμF
   *Type &Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQRD:Carbon
ERD:Carbon	ERG:Metal Oxide	PQRQ:Fuse
PQ4R:Chip	ERO:Metal Film	ERF:Wire Wound

Wattage

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor	ECCD,ECKD,PQCBC,PQVP : Ceramic
ECQS:Styrol	ECQM,ECQV,ECQE,ECQU,ECQB : Polyester
PQCBX,ECUV:Chip	ECEA,ECSZ,ECOS : Electrolytic
ECMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs
		CABINET / MECHANICAL / ELECTRICAL PARTS	
		(1. GENERAL SECTION)	
10	C60-02830	Spacer, Sub Frame 2	2
11	C60-19080	Cover, Connector	2
12	620-06070	Connector, Laser Driver	1
13	PFWEFLM600M	Laser Scan Unit	1
14	620-06130-01	Connector, Polygon Motor	1
15	C60-00850	Spacer, One Way	1
16	PFHR1125Z	Guide, B	1
17	PFMD1036Z	Frame, Bottom	1
18	620-06020	Connector, CIS(2)	1
19	PFHR1124Z	Guide, A	1
20	C60-02140	Guide, Rail Board	1
21	C60-01090	Cover, ROM	1
22	B003-00011	Clamper	1
23	C60-10060	Frame	1
24	700-006A	AC Soket	1
25	C62-99010	Brush,Anti-Static	2
26	B003-00010	Clamper	1
27	C62-18630	Spacer	2
28	620-06080	Lead Wire	1
29	PFQT1577Z	LAbel,Laser Caution	1
			1

Ref. No.	Part No.	Part Name & Description	Pcs
		(2. OPERATION PANEL SECTION)	
101	PFBE1003Z5	Knob, Jog Dial	1
102	PFHX1117Y	Spacer, Jog Dial	1
103	PFGV1008Z	Transparent Plate	1
104	PFGD1042X	Sheet, Tel Card	1
105	PFYPFLM600G	Grille, Operation	1
106	PFBX1076Y1	Button, Menu	1
107	PFBX1075Z1	Button, Volume	1
108	PFBX1074Z1	Button, One Touch	1
109	PFAVJS10101	LCD	1
110	PFBC1033Z1	Button, Start	1
111	PFBC1034Z1	Button, Stop	1
112	PFGP1134Z	Cover, LED	1
113	PFBC1035Z1	Button, Help	1
114	PFBX1073Z1	Button, 16(Dial)	1
115	620-06200	Connector, Ope. Panel	2
116	PFDE1092Z	Lever, Doc. Detection	1
117	C60-19700	Cover, Panel Stopper	2
118	C60-01110-WA	Cover, Scan Upper	1
119	C60-01190	Guide, Retard Pad	1
120	C60-10540	Plate Spring, ADF Set	1
121	C60-18120	Rubber, Separator	1
122	C60-00710	Clamper, Retard Pad	1
123	C60-10500	Angle, Doc Eject Idle Roller	2
124	C60-05270	Roller, Doc Eject Idle	2
125	C60-35010	Coil Spring, ADF	1
126	C60-14090	Shaft, Feed Idle	1
127	C60-05260	Roller, Scan Feed Idle	2
128	C60-10560	Plate Spring, Feed Roller	1
129	PFKE1011X1	Cover, Front	1
130	PFGP1135W	Panel, LCD Panel	1
131	C62-99020	Brush, Paper Earth	1
132	C62-91220	Cover, Eject	1
133	C62-91210	Cover, Paper Earth	1
		(3. SUB FRAME SECTION 1)	
201	C60-35070	Coil Spring, OPC Cover	2
202	C60-01140	Cover, Cushion	2
203	C60-10580	Plate Spring, OPC	2
204	PFQT1494Z	Label, High Temp. Warning	1
205	C60-02020	Frame, Heat Fixing	1
206	C60-01040	Cover, Electrode	1
207	C60-15110	Roller, Exit	2
208	C60-02610	Shaft, Exit Roller	1
209	627-00020	Fuser, Thermo	2
210	C60-10210	Angle, Electrode AC LH	1
211	C60-10380	Angle, Electrode Heat Roller GND	1
212	627-00010	Thermistor	1
213	PFJT1012Z	Angle, Electrode AC Middle 1	1
214	PFJT1013Z	Angle, Electrode AC Middle 2	1
215	C60-10440	Angle, Electrode AC RH	1
216	C60-00920	Spacer, Heat Roller RH	1
217	C60-00910	Spacer, Heat Roller LH	1
218	C60-00660	Gear, Heat Roller	1
219	PFDR1010Z	Roller, Heat	1
220	626-10020	Lamp, Halogen	1
221	C60-01130	Cover, Heat Fixing	1
222	C60-00350	Gear, Exit Idle	1
223	C60-10490	Angle, Paper Stacking	2
224	C60-10330	Angle, Electrode High Voltage	1
225	C60-00900	Spacer, Back Up Roller	2
226	C60-35040	Coil Spring, Back Up Roller	2
227	C60-15350	Roller, Back Up	1
228	C60-17060	Spacer, Paper Stacking	2
229	C60-19230	Sheet, Manual Guide	2

This replacement parts list is for KX-FLM600G only Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
230	C60-00830	Spacer, D6 Lever	2
231	C60-00720	Roller, Transfer Roller	2
232	C60-00640	Gear, Transfer Roller	1
234	C60-15040	Roller, Transfer	1
235	620-06060-01	Lead Wire, Heater	1
236	C60-00360	Gear, Exit Roller	1
237	C60-10370	Angle, Electrode Trans. High Volt	1
238	C60-19090	Cover, Transfer Guide	1
239	C60-10360	Angle, Transfer Discharge	1
240	C60-02030	Frame, Transfer	1
241	PFHR1151Z	Guide, Trans Path	1
242	C60-10350	Angle, Trans. GND	1
243	C60-35090	Coil Spring, Trans. Roller	2
		(4. SUB FRAME SECTION 2)	
301	PFKS1034Z1	Tray, Document	1
302	C60-02410-WA	Guide, Doc. Tray	1
303	C60-02210-WA	Guide, Adjust L	1
304	C60-02220-WA	Guide, Adjust R	1
305	C60-01100-WA	Cover, Scan Lower	1
306	C60-15130	Roller, Scan Feed	1
307	C60-15010	Roller, ADF	1
308	C60-00830	Spacer, D6 Lever	2
309	C60-00220	Gear, ADF Roller	1
310	C60-35020	Coil Spring, ADF Clutch	1
311	C60-00820	Spacer, ADF Clutch	1
312	C60-00390	Gear, Feed Roller	1
313	C60-00810	Spacer, ADF & Feed	1
314	620-06012	Connector, CIS(1) For Dina	1
315	Not Used		
316	PFHR1126Z	Guide, CIS	1
317	C60-35050	Coil Spring, CIS	2
318	620-06290	Lead Wire, CIS Ground	1
319	C60-35090	Coil Spring, Trans. Roller	3
320	C60-10520	Plate Spring, Cover Open	2
321	C60-10320	Angle, Electrode Back Up Roller	1
322	620-06170	Connector, Thermister	1
323	C60-05210	Roller, Exit Idle	2
324	C60-35060	Coil Spring, Exit Idle Roller	2
325	PFQT1573Z	Label, Face down	1
326	C60-10340	Angle, Electrode Trans. GND	1
327	C60-02370-G9	Lever, Hook	1
328	C60-10470	Angle, Hook	1
329	C60-01410	Arm, Hook	2
330	C60-01150	Cover, Sub Frame LH	1
331	C60-14100	Shaft, Register Idle	1
332	C60-05250	Roller, Register Idle	2
333	C60-01320	Lever, Manual Feed Sensor	1
334	C60-10570	Plate Spring, Register Roller	1
335	C60-00650	Gear, Planetary	2
336	C60-00250	Gear, Carrier	1
337	C60-00590	Gear, Solar	1
338	C60-35030	Coil Spring, Clutch Inscribed Gear	1
339	C60-00880	Spacer, Scan & Eject	4
340	C60-15360	Roller, Scan (CIS)	1
341	C60-00580	Gear, Scan Roller Small	1
342	C60-00570	Gear, Scan Roller Large	1
343	C60-00450	Gear, Inscribed	1
344	C60-00270	Gear, Doc. Eject Roller LH	1
345	C60-15120	Roller, Eject	1
346	C60-00280	Gear, Doc. Eject Roller RH	1
347	C60-02040	Chassis, Sub	1
348	C60-00210	Gear, ADF Idle	1
349	C60-10450	Angle, Swing Gear Large	1

Ref. No.	Part No.	Part Name & Description	Pcs
350	B000-05050	Washer, Paper Swing Gear	1
351	C60-10460	Angle, Swing Gear Small	1
352	C60-35100	Coil Spring, Swing Gear	1
353	C60-00630	Gear, Swing 38	1
354	C60-00620	Gear, Swing 22/26	1
355	C60-02340	Lever, Swing Gear	1
356	Not used		
357	C60-01660	Guide, Swing Gear	1
358	620-06190	Lead Wire, Tx Roller GND	1
359	C60-10390	Angle, Tx Roller GND	1
360	C60-01160	Cover, Sub Frame RH	1
361	M62-61350	Image Sensor	1
362	C60-00230	Gear, Adjust Doc.	1
363	C60-19760	Cover	1
364	B000-00860	Washer	1
365	620-06280	Lead Wire	1
366	B003-00010	Clamper	1
367	B003-10013	Clamper	1
368	PFQT1163Z	Label,DTS	1
		(5. FRAME COVER / MOTER SECTION)	
401	PFKM1044Z1	Cabinet Body, Handset Top	1
402	PFBH1010Z1	Button, Hook	1
403	PQAS5P13Y	Speaker	1
404	620-06210	Connector, Speaker	1
405	PFKF1029Z1	Cabinet, Handset Bottom	1
406	PFMD1037Z	Angle, Rear	1
407	PFKV1018Z1	Cover, Paper Cassette	1
408	620-06270	Connector, Hand Set	1
409	609-00011	Insulator (Ferrite Core)	2
410	PFKS1036Z1	Stacker(Tray), Paper	1
411	PFGT1521Z	Name Plate	1
412	PFKF1031Z1	Cabinet, Main	1
413	PFQT1577Z	Label, LASER Caution	1
414	C60-01910	Cover, Document	1
415	619-00012	Motor	1
416	C60-10050	Angle, Fuser Swing	1
417	Not Used		
418	C60-35260	Spring, Fuser Swing	1
419	C60-00420	Gear, Fuser Swing	1
420	C60-10071	Angle, Motor	1
421	C60-00410	Gear, Fuser Idle	1
422	C62-00480	Gear, Main 12	1
423	C60-10030	Chassis, Drive Main	1
424	620-06091	Connector, Main Motor RM	1
425	B003-00010	Clamper	2
426	PFQT1514Z	Label, Duct	1
427	PFMH1065Z	Angle, PCB	2
428	PFQT1254Z	Label, Caution	1
429	B003-00011	Clamper	1
430	B000-04070	Washer	1
431	PFQT1574Z	Label,Product Class	1
432	PFQT1575Z	Label,TEL	1
		(6. CASSETTE TRAY SECTION)	
501	C60-10230	Frame, Lift Paper	1
502	C60-18110	Rubber, Sheet	1
503	C60-01430-WA	Lever, Lift Path	1
504	C60-35210	Spring, Bar Lift	2
505	C60-02110-WA	Guide, Paper Left	1
506	PFKE1009Z1	Case, Cassette(Main)	1
507	PFKE1010Z1	Case, Cassette(Rear)	1

KX-FLM600G

This replacement parts list is for KX-FLM600G only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
508	C60-19160	Cover, Cassette GND	1
509	PFQT1496Z	Label, Upper Limit	2
510	C60-02130-WA	Guide, Paper Right	1
511	C60-14080	Shaft, Manual Back Up	2
512	C60-05240	Roller, Manual Back Up	2
513	C60-35220	Plate Spring	2
514	C60-01650-WA	Angle, Separation	1
515	C60-18140	Pad, Separation	1
516	C60-10430	Angle, Pad GND	1
517	C60-01640-WA	Cover, Pad Saper.	1
518	C60-35230	Spring, Pad	1
519	PFDE1091Z	Lever, Paper indicator	1
520	C60-35300	Spring, Lift L	1
521	C60-01670	Bracket, Lift	1
522	C60-35310	Spring, Lift R	1
523	PFMD1035Z	Cover, Paper Cassette B Cover	1
		(7. MAIN FRAME SECTION)	
601	M60-62610	Fan Ass'y	1
602	Not Used		
603	Not Used		
604	C60-10010	Angle, SMPS GND	1
605	C60-02010	Chassis, Engine	1
606	C60-10300	Angle, Electrode OPC	1
607	C60-10290	Angle, Electrode DVP	2
608	C60-14520	Pin, Electrode	4
609	Not Used		
610	C60-10310	Angle, Electrode Transfer	1
611	C60-10400	Angle, Electrode Counter	1
612	C60-10480	Angle, Hinge DVP	1
613	C60-02150	Guide, Cassette L	1
614	C60-18210	Foot, Base	2
615	C60-02330	Lever, Toner Sensor Frame	1
616	C60-00870	Spacer, Pick Up	2
617	C60-01350	Lever, Paper Sensor	1
618	M60-14010	Pick Up & Register Roller Ass'y	1
619	C60-02050	Chassis, Pick Up	1
620	C60-35240	Spring, Pick Up	1
621	C60-01330	Lever, Clutch	1
622	C62-19770	Sheet, Feed Roller	2
623	C60-01370	Lever, Solenoid	1
624	625-00030	Solenoid, Pick Up	1
625	C60-10240	Angle, Solenoid	1
626	C60-02160	Guide, Cassette R	1
627	C60-18220	Foot, Base Rear	2
628	C60-00850	Spacer, One Way	1
629	B000-00870	Washer, One way	2
630	C60-14510	Pin, Shaft Pick Up	1
631	C60-00500	Gear, OPC DVP Drive	1
632	C60-14070	Shaft, One Way	1
633	B000-04060	Washer,DVP Drive Frame	
634	C60-00680	Gear, One Way Clutch	1
635	C60-01680	Chassis, Drive Sub	1
636	C60-00290	Gear, DVP Drive Frame	1
637	B000-00880	Washer, DVP Drive Frame 2	1
638	C60-00490	Gear, OPC Drive Frame	1
639	B000-04050	Washer, DVP Drive Frame	
640	C60-00860	Spacer, Pick Up FR	1
641	C60-00400	Gear, Feeder	1
642	C60-10420	Angle, GND OPC	1
643	C60-00370	Gear, Fax Idle 1	1
644	C60-00380	Gear, Fax Idle 2	2
645	C60-01360	Actuator	1
646	C60-14550	Weight	1

Ref. No.	Part No.	Part Name & Description		Pcs
		(SCREWS/WASHERS/E-RINGS)		
A	XTW3+S8M	Screw	S	44
B	XTB3+6G	Screw	S	30
C	B000-82006	Screw		1
D	XTB26+5G	Screw	S	3
E	XSB3+5	Screw	S	5
F	XSB3+6FN	Screw	S	1
G	XTB3+30G	Screw	S	2
H	B000-62605	Screw		4
I	B000-22003	Screw		1
J	XSB26+5	Screw	S	1
K	B000-6300610	Screw		1
L	B000-6300815	Screw		2
M	B000-6300850	Screw		9
N	B000-6300865	Screw		2
P	B000-6301015	Screw		2
Q	B000-6401050	Screw		1
R	B000-6301215	Screw		2
S	B000-1300851	Screw		3
T	B000-6301050	Screw		1
U	XTB4+10G	Screw	S	3
V	XTW26+8	Screw	S	15
W	XTB3+10G	Screw	S	5
Y	B000-8300801	Screw		2
Z	XYN3+C8FNS	Screw	S	6
E1	XUC3FY	E-Ring	S	1
E2	XUC4FY	E-Ring	S	3
E3	XUC6FY	E-Ring	S	1
W1	B000-04040	Washer		1
a	XYC3+FF6	Screw	S	6
b	B000-73006	Screw		3
d	B000-82008	Screw		2
e	B000-8300802	Screw		4
f	XSB4+6	Screw	S	1
		ACCESSORIES AND PACKING MATERIALS		
A1	PFZXFLM600G	Paper Tray Ass'y		1
A1-1	PFQT1579Z	Label		1
A1-2	C62-02920-E1	Tray, Manual Extend		1
A1-3	C62-18620	Rubber, Paper Tray		2
A2	PFJXE0305Z	Handset		1
A3	PFJA1031Z	Printer Cable		1
A4	PQJA10038Y	Power Cord	⚠	1
A5	PFJA1029Z	Handset Cord		1
A6	PFJA1005Z	Telephone Line Cord	⚠	1
A7	Not used			
A8	Not used			
A9	PFQX1354Z	Instruction Book		1
A10	Not used			
A11	Not used			
A12	PFJK201A5131	CD-ROM		1
A13	XZB15X40A04	Bag		1
A14	XZB26X35A04	Bag		1
A15	PFJA1010Z	Card,TEL.Socket adaptor		1
P1	PFPK1567Z	Packing Case		1
P2	PFPN1173Z	Cushon, L		1
P3	PFPN1174Z	Cushon, R		1
P4	PFPH1020Z	Sheet		1
P5	PFPN1181Z	Cushon, Top		1
P6	PFPD1078Z	Cushon		1

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Ref. No.	Part No.	Part Name & Description	Pcs
		DIGITAL BOARD PARTS	
PCB1	**PFWP1FLM600G**	**DIGITAL BOARD ASS'Y(RTL)**	**1**
		(ICs)	
IC802	PFVIR676811	IC	1
IC804	PFVIMS5178JG	IC	1
IC805	PQVICX58257C	IC S	1
IC806	PFVIMM1385EN	IC	1
IC807	PFVIM66410G1	IC	1
IC808	PFWIFLM600G	IC	1
IC809	PFVIS80842AN	IC	1
IC810	PFVITVT245FT	IC	1
IC811	AN6383SB	IC	1
IC812	PQVINJM2113M	IC	1
		(TRANSISTORS)	
Q800	2SD1921Q	TRANSISTOR(SI)	1
Q801	2SC4155R	TRANSISTOR(SI)	1
Q802	2SB1197K	TRANSISTOR(SI)	1
Q803	2SC4155R	TRANSISTOR(SI)	1
Q805	2SC4155R	TRANSISTOR(SI)	1
Q804	PQVTDTC114EU	TRANSISTOR(SI)	1
		(DIODES)	
DA800	MA141WK	DIODE(SI)	1
D800	RLS71	DIODE(SI)	1
		(BATTERY)	
BAT800	PQPCR2032H09	LITHIUM BATTERY S	1
		(CONNECTORS)	
CN800,801	PFJP18A24Z	CONNECTOR	2
CN802	PFJP26A25Z	CONNECTOR	1
		(CAPACITORS)	
C800,801	ECUV1C104KBV	0.1 S	2
C802,803	ECEV1HA100	10	2
C804,805	ECUV1C104KBV	0.1 S	2
C806	PQCUV1H105JC	1 S	1
C807	ECUV1C104KBV	0.1 S	1
C808	PQCUV1H105JC	1 S	1
C809	ECUV1C104KBV	0.1 S	1
C818	ECUV1H110JCV	11P	1
C819	ECUV1H120JCV	12P	1
C820	ECUV1C104KBV	0.1 S	1
C821	ECEV1HA100	10	1
C822	ECUV1H330JCV	33P	1
C823	ECEA1HKS100	10 S	1
C824	ECUV1C104KBV	0.1 S	1
C836	ECUV1H100DCV	10P S	1
C837	ECUV1H150JCV	15P	1
C838,839	ECUV1C104KBV	0.1 S	2
C841	PQCUV1H104ZF	0.1	1
C842	ECEA1HKS010	1 S	1
C843,844	ECUV1H222KBV	0.0022	2
C845	ECUV1C104KBV	0.1 S	1
C846	ECUV1C104KBV	0.1 S	1
C847	ECUV1H330JCV	33P	1
C848,849	ECUV1C104KBV	0.1 S	2
C850,851	ECUV1H270JCV	27P	2
C852,853	ECUV1H150JCV	15P	2
C854	ECEA1EKA330B	33	1
C857	ECEA1HKS100	10 S	1
C858	PQCUV1H104ZF	0.1	1
C859	ECUV1C104KBV	0.1 S	1
C862~834	ECUV1C104KBV	0.1 S	3
C865	ECEV0JA101	100	1
C866,867	ECUV1C104KBV	0.1 S	2
C868	ECUV1H150JCV	15P	1
C869	ECUV1C104KBV	0.1 S	1
C870	ECUV1H120JCV	12P	1
C871~874	ECUV1C104KBV	0.1 S	4
C876	ECUV1C104KBV	0.1 S	1
C877	ECUV1C224ZFV	0.22	1
C878~885	ECUV1C104KBV	0.1 S	8
C887	ECUV1H102KBV	0.001	1
C888	ECUV1C104KBV	0.1 S	1
C889	ECUV1H332KBV	0.0033	1
C890	ECEA0JK221	220 S	1
C891	ECUV1C104KBV	0.1 S	1
C896	ECUV1H103KBV	0.01	1
C901,904	ECUV1C104KBV	0.1	2
C905,906	ECUV1H102KBV	0.001	2
C907	ECUV1H101JCV	100P	1
C908	ECUV1H330JCV	33P	1
C909,910	ECUV1C104KBV	0.1	2
C911	ECUV1H223KBV	0.022 S	1
C912	ECEA1CK101	100 S	1
C913	ECUV1H121JCV	120P	1
C914,916	ECUV1C104KBV	0.1	2
C917	ECEA0JK221	220 S	1
C918	ECUV1C104KBV	0.1 S	1
C919	ECEA1HKS100	10 S	1
C920	ECUV1H821KBV	820P	1
C921	ECUV1H181JCV	180P	1
C922	ECUV1C104KBV	0.1	1
C923	ECUV1C473KBV	0.047	1
C924	ECUV1C104KBV	0.1	1
C928	ECEA1CK101	100 S	1
C929	ECUV1H472KBV	0.0047	1
C930	ECUV1C334ZFV	0.33	1
C932,935	ECUV1A105ZFV	1	2
C934~946	ECUV1C104KBV	0.1 S	3
C937	ECUV1H102KBV	0.001	1
C944	ECUV1C104KBV	0.1 S	1
		(COILS & CERAMIC FILTERS)	
L800	PQLQR2BT	COIL S	1
L803	PQLQR2BT	COIL S	1
L805,806	PQLQR1ET	COIL	2
L807	PFVF2B222ST	CERAMIC FILTER	1
L808,809	PFVF2B222SDT	CERAMIC FILTER	2
L812	PQLQR2BT	COIL S	1
L815	PFVF2B222ST	CERAMIC FILTER	1
R884,885	PFVF1B252SDT	CERAMIC FILTER	2
R886	PFVF2B272ST	CERAMIC FILTER	1
R887,888	PFVF1B252SDT	CERAMIC FILTER	2
		(RESISTORS)	
F1,2	ERJ6GEY0R00	0	2
J800	ERJ3GEY0R00	0	1
L801,802	ERJ6GEY0R00	0	2
L804	ERJ6GEY0R00	0	1
C940	ERJ3GEY0R00	0	1
R800,807	ERJ3GEYJ103	10K	2
R808	ERJ3GEYJ272	2.7K	1
R809	ERJ3GEYJ102	1K	1
R811	ERJ3GEYJ331	330	1
R812	ERJ3GEYJ472	4.7K	1

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This replacement parts list is for KX-FLM600G only Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
R817	ERJ3GEYJ203	20K	1
R822	ERJ3GEYJ103	10K	1
R823	ERJ3GEYJ222	2.2K	1
R828	ERJ3GEYJ470	47	1
R829	ERJ3GEYJ103	10K	1
R830	ERJ3GEYJ101	100	1
R831	ERJ3GEYJ105	1M	1
R832,833	ERJ3GEYJ101	100	2
R834,835	ERJ3GEYJ103	10K	2
R836,837	ERJ3GEYJ101	100	2
R838	ERJ3GEY0R00	0	1
R840,841	ERJ3GEY0R00	0	2
R847	ERJ3GEYJ472	4.7K	1
R848,849	ERJ3GEYJ101	100	2
R850	ERJ3GEYJ472	4.7K	1
R851	ERJ3GEYJ912	9.1K	1
R853,855	ERJ3GEY0R00	0	2
R856	ERJ3GEYJ472	4.7K	1
R857	ERJ3GEYJ472	4.7K	1
R858	ERJ3GEY0R00	0	1
R859	ERJ3GEYJ472	4.7K	1
R860	ERJ3GEYJ103	10K	1
R861	ERJ3GEYJ103	10K	1
R862~864	ERJ3GEYJ101	100	3
R865	ERJ3GEYJ222	2.2K	1
R866	ERJ3GEYJ122	1.2K	1
R867	ERJ3GEYJ221	220	1
R868	ERJ3GEYJ122	1.2K	1
R869	ERJ3GEYJ821	820	1
R870~872	ERJ8GEY0R00	0	3
R874	ERJ6GEY0R00	0	1
R876	ERJ3GEYJ103	10K	1
R877	ERJ3GEYJ101	100	1
R879	ERJ3GEYJ472	4.7K	1
R880	ERJ3GEYJ103	10K	1
R881	ERJ3GEYJ101	100	1
R882	ERJ3GEYJ472	4.7K	1
R883	ERJ3GEYJ102	1K	1
R889	ERJ3GEYJ102	1K	1
R890	ERJ3GEYJ102	1K	1
R891~898	ERJ3GEYJ101	100	8
R910	ERJ3GEYJ222	2.2K	1
R912	ERJ3GEYJ472	4.7K	1
R917,918	ERJ3GEYJ473	47K	2
R919	ERJ3GEYJ103	10K	1
R920	ERJ3GEYJ563	56K	1
R921	ERJ3GEYJ823	82K	1
R922	ERJ3GEY0R00	0	1
R923	ERJ3GEYJ103	10K	1
R924	ERJ3GEYJ334	330K	1
R925	ERJ3GEYJ562	5.6K	1
R927	ERJ3GEYJ244	240K	1
R928	ERJ3GEYJ183	18K	1
R929	ERJ3GEYJ683	68K	1
R930	ERJ3GEYJ154	150K	1
R931	ERJ3GEYJ103	10K	1
R932	ERJ3GEYJ224	220K	1
R933	ERJ3GEYJ224	220K	1
R934	ERJ3GEYJ124	120K	1
R935~937	ERJ3GEYJ101	100	3
R938	ERJ3GEYJ153	15K	1
R939	ERJ3GEYJ393	39K	1
R940	ERJ3GEYJ102	1K	1
R941,942	ERJ3GEYJ103	10K	2
R944	ERJ3GEYJ4R7	4.7	1
R945	ERJ3GEYJ103	10K	1

Ref. No.	Part No.	Part Name & Description	Pcs
R948	ERJ3GEYJ101	100	1
R949~952	ERJ3GEYJ103	10K	4
R953	ERJ3GEYJ4R7	4.7	1
R954	ERJ3GEYJ102	1K	1
R955	ERJ3GEYJ332	3.3K	1
R956	ERJ3GEYJ473	47K	1
R957	ERJ3GEYJ564	560K	1
R958	ERJ3GEYJ221	220	1
R962	ERJ8GEYJ8R2	8.2	1
		(COMPONENTS COMBINATION)	
RA800,801	EXRV8V471JV	RESISTOR ARRAY	2
RA802,803	EXRV8V470JV	RESISTOR ARRAY	2
RA804,805	EXRV8V101JV	RESISTOR ARRAY	2
RA806,807	EXRV8V000JV	RESISTOR ARRAY	2
RA808,809	EXRV8V101JV	RESISTOR ARRAY	2
RA810	EXRV8V103JV	RESISTOR ARRAY	1
		(CRYSTAL OSCILLATORS)	
X800	PFVC32256ZAT	CRYSTAL OSCILLATOR	1
X801	PFVCCSA24Z	CRYSTAL OSCILLATOR	1
X802	PFVCCFS32Z	CRYSTAL OSCILLATOR	1

This replacement parts list is for KX-FLM600G onl' Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
		ANALOG BOARD PARTS	
PCB2	**PFLP1177GZ**	**ANALOG BOARD ASS'Y (RTL)**	**1**
		(IC)	
IC601	PQVINJM4558M	IC S	1
IC602	AN6183S	IC	1
IC603	PQVINJM4558M	IC S	1
IC604	PQXDTHS56F	IC S	1
IC605,606	PQVINJM4558M	IC S	1
		(TRANSISTORS)	
Q600	PQVTDTC143E	TRANSISTOR(SI)	1
Q601	2SA1627	TRANSISTOR(SI)	1
Q602	PQVTDTC143E	TRANSISTOR(SI)	1
Q603	2SC4155S	TRANSISTOR(SI)	1
Q604	2SB1218A	TRANSISTOR(SI)	1
Q605	2SC2235	TRANSISTOR(SI)	1
Q608	PQVTDTC143E	TRANSISTOR(SI)	1
Q612	2SC4155S	TRANSISTOR(SI)	1
Q613~615	PQVTDTC114EU	TRANSISTOR(SI)	3
Q618	2SA1627	TRANSISTOR(SI)	1
Q619,620	2SC4155S	TRANSISTOR(SI)	2
		(DIODES)	
D601~603	1SS119	DIODE(SI)	3
D604	MA700A	DIODE(SI)	1
D605	1SS119	DIODE(SI)	1
D606	PFVDDGS1ZB60	DIODE(SI)	1
D607~609	1SS119	DIODE(SI)	3
D610,611	MA4056	DIODE(SI)	2
D612,613	1SS119	DIODE(SI)	2
D615,616	MA4056	DIODE(SI)	2
D620	MA4056	DIODE(SI)	1
D628	MA723	DIODE(SI)	1
		(CONNECTOR)	
CN600,601	PQJJ1TC5Z	JACK/SOCKET S	2
CN602	PQJS18A99Z	CONNECTOR	1
CN603	PQJP8G43Y	CONNECTOR	1
CN604	PQJS18A99Z	CONNECTOR	1
		(CAPACITORS)	
C600	ECQE2104KF	PLASTIC FILM CAPACITOR	1
C601	ECQE2E474KZ	0.47 S	1
C604	ERDS2TJ000	0	1
C605,606	ECKD2H681KB	680P S	2
C607	ECUV1H103KBV	0.01	1
C608	ECEA1HKS220	22 S	1
C609	PFCA1HYK101M	100P	1
C611	ECUV1H332KBV	0.0033	1
C612	ECUV1C104KBV	0.1 S	1
C614	ECEA1CK101	100 S	1
C615	ECEA1VU101	100	1
C616	ECUV1C104KBV	0.1 S	1
C618	ECEA1HKS010	1 S	1
C621	ECEA1HKS2R2	2.2 S	1
C622	ECEA1EK470	47 S	1
C625	ECEA0JU331	330	1
C626,627	ECUV1C104KBV	0.1 S	2
C631	PQCUV1E563MD	0.056 S	1
C632	PQCUV1C334KB	0.33	1
C633	ECEA1HKS4R7	4.7 S	1
C634	ECUV1C273KBV	0.027	1
C635	ECEA0JU331	330	1
C636~638	ECUV1C104KBV	0.1 S	3
C640	ECUV1H331JCV	330P	1
C642,643	ECUV1C104KBV	0.1	2
C644	PQCUV1C224KB	0.22	1
C645	PQCUV1C334KB	0.33	1
C646	PQCUV1E563MD	0.056 S	1
C647	ECUV1H103KBV	0.01	1
C648	ECEA1CKS470	47 S	1
C649	ECUV1H103KBV	0.01	1
C650	ECUV1C104KBV	0.1	1
C651	ECEA1CKS100	10 S	1
C652	ECUV1C104KBV	0.1 S	1
C653,654	ECUV1H181JCV	180P	2
C657	ECUV1H103KBV	0.01 S	1
C658	ECEA1CKS100	10 S	1
C659	ECUV1H103KBV	0.01	1
C660,661	ECUV1H102KBV	0.001	2
C662	ECUV1C104KBV	0.1	1
C663	PQCUV1C224KB	0.22	1
C664,665	ECUV1C104KBV	0.1	2
C666	ECUV1H221JCV	220P S	1
C667,668	ECUV1C104KBV	0.1 S	2
C669	ECEA0JU331	330	1
C670	ECEA1CKS100	10 S	1
C671	ECUV1H333KDV	0.033 S	1
C672,673	ECUV1C273KBV	0.027	2
C674	ECUV1H333KDV	0.033 S	1
C680	ECEA1HN330S	33	1
C689	ECUV1H392KBV	0.0039	1
C690	ECUV1C104KBV	0.1	1
C692	ECUV1H222KBV	0.0022	1
C693	ECUV1C104KBV	0.1 S	1
C694	ECUV1H821KBV	820P	1
C695	ECUV1H332KBV	0.0033	1
C696	ECUV1H472KBV	0.0047	1
C697	ECUV1H223KBV	0.022 S	1
C698	ECUV1C104KBV	0.1 S	1
C699	ECUV1H392KBV	0.0039	1
C700	ECUV1H682KBV	0.0068	1
C701	ECUV1C273KBV	0.027	1
C702	ECEA1HKS4R7	4.7 S	1
C703,704	ECEA1VU331	330	2
C705	ECUV1E105ZF	1	1
C711	ECEA1HKS4R7	4.7 S	1
		(COILS & CERAMIC FILTERS)	
L600,601	PFVF3A601ST	CERAMIC FILTER	2
L602	EXCELDR35	COMPONENTS PARTS	1
L603,604	PFVF3A601ST	CERAMIC FILTER	2
L605~610	PFVF2B272ST	CERAMIC FILTER	6
L611,612	PQLQXD152K	COIL	2
L613,614	PFVF2B272ST	CERAMIC FILTER	2
		(PHOTO ELECTRIC TRANSDUCERS)	
PC601	PQVITLP620K	PHOTO COUPLER ⚠	1
PC602	PQVITLP627	PHOTO COUPLER ⚠	1
PC603,606	0N3131SKU	PHOTO COUPLER ⚠	2
		(RELAY)	
RLY600	ATXD20328	RELAY ⚠	1

KX-FLM600G

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Ref. No.	Part No.	Part Name & Description	Pcs
		(RESISTORS)	
C713,714	ERJ6GEY0R00	0	2
J604,605	ERDS2TJ000	0	2
J609~611	ERJ3GEY0R00	0	3
J615	ERDS2TJ000	0	1
J618,619	ERDS2TJ000	0	2
J621,631	ERDS2TJ000	0	2
J633~635	ERDS2TJ000	0	3
J641,645	ERDS2TJ000	0	2
J648	ERDS2TJ000	0	1
J652	ERJ3GEY0R00	0	1
POS600	ERDS2TJ000	0	1
R600	ERJ3GEYJ103	10K	1
R602	ERDS1TJ183	18K S	1
R603	ERJ3GEYJ512	5.1K	1
R604	ERDS1VJ561	560	1
R605	ERDS1VJ5R6	5.6	1
R607	ERDS1TJ473	47K S	1
R608	ERJ3GEYJ103	10K	1
R609	ERJ3GEYJ562	5.6K	1
R610	ERJ3GEYJ472	4.7K	1
R611	ERJ3GEYJ102	1K	1
R612	ERJ3GEYJ104	100K	1
R613	ERJ3GEYJ473	47K	1
R614	ERJ3GEYJ822	8.2K	1
R615	ERJ3GEYJ474	470K	1
R616	ERJ3GEYJ105	1M	1
R617	ERJ3GEYJ333	33K	1
R618	ERJ3GEYJ105	1M	1
R620,621	ERJ3GEYJ223	22K	2
R624	ERJ3GEYJ101	100	1
R625	ERJ3GEYJ222	2.2K	1
R626	ERJ3GEYJ123	12K	1
R629	ERJ3GEYJ102	1K	1
R631	ERDS2TJ000	0	1
R640	ERJ3GEYJ682	6.8K	1
R641	PQ4R10XJ182	1.8K S	1
R642	PQ4R10XJ332	3.3K S	1
R643	ERJ3GEYJ242	2.4K	1
R644	ERDS2TJ000	0	1
R645	ERJ3GEYJ153	15K	1
R646	ERJ3GEY0R00	0	1
R647	ERJ3GEYJ433	43K	1
R648	ERJ3GEY0R00	0	1
R649	ERJ3GEYJ334	330K	1
R650	ERJ3GEYJ561	560	1
R651	ERJ3GEYJ563	56K	1
R653	ERJ3GEYJ331	330	1
R654	ERJ3GEYJ563	56K	1
R655	PQ4R10XJ332	3.3K S	1
R657	PQ4R10XJ182	1.8K S	1
R658	ERJ3GEYJ331	330	1
R659	ERJ3GEYJ182	1.8K	1
R660	ERJ3GEYJ182	1.8K	1
R661	ERJ3GEYJ153	15K	1
R662	ERJ3GEYJ114	110K	1
R663,664	ERJ3GEY0R00	0	2
R665	ERJ3GEYJ114	110K	1
R667	ERJ3GEYJ473	47K	1
R668	ERJ3GEYJ101	100	1
R670	ERJ3GEYJ473	47K	1
R671,672	ERJ3GEYJ104	100K	2
R673	ERJ3GEYJ682	6.8K	1
R674	ERJ3GEY0R00	0	1
R675	ERJ3GEYJ333	33K	1
R676	ERJ3GEYJ433	43K	1

Ref. No.	Part No.	Part Name & Description	Pcs
R677	ERJ3GEYJ223	22K	1
R678	ERJ3GEYJ473	47K	1
R679	ERJ3GEYJ101	100	1
R680	ERJ3GEYJ331	330	1
R681	ERJ3GEYJ474	470K	1
R682	ERJ3GEYJ124	120K	1
R683	ERJ3GEY0R00	0	1
R685~689	ERJ3GEYJ103	10K	5
R690	ERJ3GEYJ474	470K	1
R691,692	ERJ3GEYJ103	10K	2
R693	ERDS1VJ4R7	4.7	1
R698,699	ERJ3GEYJ332	3.3K	2
R708	ERJ3GEYJ333	33K	1
R710	ERJ3GEYJ103	10K	1
R711	ERJ3GEYJ153	15K	1
R714	ERJ3GEY0R00	0	1
R715	ERG2SJ821	820	1
R716	ERDS2TJ120	12	1
R717	ERJ3GEYJ561	560	1
R718	ERJ3GEYJ204	200K	1
		(VARISTORS)	
SA600	PQVDRA311PT3	VARISTOR ⚠ S	2
SA601	PFRZ001Z	VARISTOR ⚠	1
ZNR600	ERZC07DK121	VARISTOR ⚠	1
ZNR601	ERZC07DK121	VARISTOR ⚠	1
		(TRANSFORMERS)	
T600	PFLT8E004	TRANSFORMER ⚠	1
T601	PFLT8E003	TRANSFORMER ⚠	1
		(TRANSFORMERS)	
F600	PQBA1N10NAL	FUSE	

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Ref. No.	Part No.	Part Name & Description	Pcs
		OPERATION BOARD PARTS	
PCB3	**P62-62020**	**OPERATION BOARD ASS'Y (RTL)**	1
		(IC)	
IC301	MN53007QAF	IC	1
		(DIODES)	
D301, 302	1SS119	DIODE(SI)	2
		(LEDS)	
LED301	PQVDR325CA47	LED	1
LED302	604-00004	LED	1
		(CAPACITORS)	
C306	ECUV1C104KBV	0.1 S	1
C308	ECUV1H122KBV	0.0012	1
C310~313	ECUV1H331JCV	330P	4
C314, 315	ECUV1C104KBV	0.1 S	2
C317, 322	ECUV1C104KBV	0.1 S	2
C326	ECEA1AU101	100	1
		(CONNECTORS)	
CN301	PQJP12G43Y	CONNECTOR, 12P	1
CN302	PQJS10X59Z	CONNECTOR, 10P	1
CN303	PQJP2G30Y	CONNECTOR, 2P	1
CN304	PQJP3G43Y	CONNECTOR, 3P	1
CN307	PQJP6G43Y	CONNECTOR, 6P	1
		(PHOTO ELECTRIC TRANSDUCER)	
PI301	CNA1006N	SENSOR	1
		(RESISTORS)	
R306	ERJ3GEYJ563	56K	1
R307	ERJ3GEYJ331	330	1
R308, 309	ERJ3GEYJ102	1K	2
R324~329	ERJ3GEYJ181	180	6
R334~337	ERJ3GEYJ181	180	4
R340~343	ERJ3GEYJ181	180	4
R344, 345	ERJ3GEYJ103	10K	2
R346, 347	ERJ3GEYJ181	180	2
R348	ERJ3GEYJ273	27K	1
R349	ERJ3GEYJ102	1K	1
R351, 352	ERJ3GEYJ103	10K	2
R353, 354	ERJ3GEYJ181	180	2
R355, 356	ERJ3GEYJ471	470	2
		(SWITCHES)	
SW301~334	EVQ11Y05B	SWITCH	35
SW336,337	EVQ11Y05B	SWITCH	2
SW339	EVQ11Y05B	SWITCH	1
SW342, 343	EVQ11Y05B	SWITCH	2
SW350	PFSR12A01Z	JOG SWITCH	1

Ref. No.	Part No.	Part Name & Description	Pcs
		SWITCHING MODE POWER SUPLY BOARD PARTS	
PCB4	**P62-02000**	**LOW VOLATGE POWER SUPPLY BOARD ASS'Y(RTL)** ⚠	1
		(ICs)	
IC1	PFVIFA5317P	IC S	1
IC2	680-002A	IC	1
IC3	PQVIPC817CD	PHOTO COUPLER	1
IC7	PQVINJM2904D	IC	1
		(TRANSISTORS&THYRISTOR))	
IC4	IESS001A	TRANSISTOR(SI)	1
IC8	IEMS002A	TRANSISTOR(SI)	1
Q1	610-008A	TRANSISTOR(SI)	1
Q2	680-003A	TRANSISTOR(SI)	1
Q3	610-005A	THYRISTOR(SI)	1
Q4	600-014A	TRANSISTOR(SI)	1
Q5	IDSS004A	TRANSISTOR(SI)	1
		(DIODES)	
D1	PQVDD3SBA60M	DIODE(SI)	1
D2	DGI4007A	DIODE(SI)	1
D3	DGI4P37A	DIODE(SI)	1
D4	DPC4148A	DIODE(SI)	1
D7,8	EPC5248A	DIODE(SI)	2
D9	EPC5234A	DIODE(SI)	1
D10	DGI4004A	DIODE(SI)	1
D11	PQVDD10LC20U	DIODE(SI)	1
D13	PQVDD10LC20U	DIODE(SI)	1
D16	DPC4148A	DIODE(SI)	1
D18	DPC4148A	DIODE(SI)	1
		(COILS)	
BD1,2	670-020A	BEAD CORE	2
BD4	670-020A	BEAD CORE	1
L1	520-010B	COIL	1
L2	520-018A	LINE FILTER	1
L4	530-001A	CHOKE COIL	1
L5	530-002A	CHOKE COIL	1
L6	530-009A	COIL	1
		(CONNECTORS)	
CN1	630-068A	CONNECTOR	1
CN2	630-003A	CONNECTOR	2
CN3	630-032A	CONNECTOR	1
CN4	630-003A	CONNECTOR	1
		(CAPACITORS)	
C1	CX00007B	0.1	1
C2	CX00007B	0.1	1
C3,4	CCX0002B	2200P	2
C5	CK103ZSA	0.01	1
C6	CG104ZGA	0.1	1
C7	CCX0012A	0.0047	1
C9	CE107MQG	100	1
C10	CQ104KKA	0.1	1
C12	CLX006A	0.22	1
C13	CQ102JGA	1000P	1
C14	CE226MGL	22	1
C15	CQ103KKA	0.01	1

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Ref. No.	Part No.	Part Name & Description	Pcs
C16	CQ223KZB	0.022	1
C17	CCX0012A	0.0047	1
C18	CE476MGL	4.7	1
C19	CE108MAL	1000P	1
C20	CE227MEJ	220	1
C21	CE227MEL	220	1
C24	CE338MAL	3300	1
C25	CE108MFL	1000	1
C26,27,28	CK102KUA	1000P	3
C29	CE477MFL	470	1
C30	CG104ZGA	0.1	1
C31	CK470KUA	47P	1
C32,34	CG104ZGA	0.1	2
C33	CK101KUA	100P	1
C35	CK102KUA	1000P	1
C40	CE227MEJ	220	1
		(FUSE)	
F1	640-027B	FUSE	1
			1
		(RESISTORS)	
R1	ERDS1TJ474	470K	1
R2	ERDS1TJ121	120	1
R3	ERDS1TJ101	100	1
R4	ERDS1TJ181	180	1
R5	ERDS1TJ104	100K	1
R6	RX00039B	0.15	1
R7	RC392FDA	3.9K	1
R8	ERDS1TJ101	100	1
R9	ERDS1TJ220	22	1
R11	ERDS1TJ101	100	1
R12	ERDS1TJ151	150	1
R13	RD274JFC	270K	1
R14	ERDS1TJ123	12K	1
R15	RD473JHA	47K	1
R16	ERDS1TJ123	12K	1
R18	ERDS1TJ152	1.5K	1
R19	ERDS1TJ820	82	1
R20	ERDS1TJ222	2.2K	1
R21	RC302FDA	3K	1
R22	RCX0024A	3.25K	1
R23	ERDS1TJ102	1K	1
R24,30	RC223FDA	22K	2
R25	RD820JFC	82	1
R29	RX00036A	0.02	1
R31,34	RC222BDA	2.2K	2
R32	RC502BDA	5K	1
R33	RC512BDA	5.1K	1
R35	ERDS1TJ222	2.2K	1
R36	RD102JFC	1K	1
R37	ERDS1TJ681	680	1
R38	RC202FDA	2K	1
R39	RC373FDA	37K	1
		(TRANSFORMER)	
T1	510-046B	POWER TRANSFORMER	1
		(THERMISTOR)	1
TH1	620-005A	THERMISTOR	1

Ref. No.	Part No.	Part Name & Description	Pcs
		(VARISTORS)	
VR1	660-012A	VARISTOR	1
HIGH VOLTAGE POWER SUPPLY BOARD PARTS			
PCB5	**P62-64020**	**HIGH VOLTAGE POWER ⚠ SUPPLY BOARD ASS'Y(RTL)**	**1**
		(IC)	
U101	170-00043	IC	1
SW101	PQVIMC4066BP	IC	1
		(TRANSISTORS)	
Q101	210-00025	TRANSISTOR(SI)	1
Q102	210-00026	TRANSISTOR(SI)	1
Q103~105	210-00007	TRANSISTOR(SI)	3
Q201	210-00024	TRANSISTOR(SI)	1
Q202,203	210-00007	TRANSISTOR(SI)	2
Q301	210-00024	TRANSISTOR(SI)	1
Q302,303	210-00007	TRANSISTOR(SI)	2
Q401	210-00024	TRANSISTOR(SI)	1
Q402~406	210-00007	TRANSISTOR(SI)	5
		(DIODES)	
D101,102	260-00002	DIODE(SI)	2
D103	260-00001	DIODE(SI)	1
D104,105	260-00002	DIODE(SI)	2
D106	260-00002	DIODE(SI)	1
D201~204	260-00002	DIODE(SI)	4
D205,206	260-00030	DIODE(SI)	1
D301~304	260-00002	DIODE(SI)	4
D305	260-00030	DIODE(SI)	1
D402~404	260-00002	DIODE(SI)	3
D405	260-00030	DIODE(SI)	1
D407	260-00002	DIODE(SI)	1
ZD101	270-20001-12	DIODE(SI)	1
ZD102	270-20001-15	DIODE(SI)	1
ZD201,202	270-20001-43	DIODE(SI)	2
ZD301,302	270-20001-43	DIODE(SI)	2
ZD402,403	270-20001-43	DIODE(SI)	2
		(CAPACITORS)	
C101	ECA1VM470	47	1
C102	420-10300	50P	1
C103	420-10200-50	50P	1
C104	ECA1VM330	33	1
C105	ECA1HM3R3	3.3	1
C108	ECA1HM0R47	0.47	1
C201	420-10400-50	50P	1
C202	420-22200-50	50P	1
C203,204	ECA1HM3R3	3.3	2
C205,206	400-22200-B	10	2
C301	420-10400-50	50P	1
C302	420-22200-50	50P	1
C303,304	ECA1HM3R3	3.3	2
C305	400-22200-B	10	1
C401	420-10400-50	50P	1
C402	420-22200-50	50P	1

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Ref. No.	Part No.	Part Name & Description	Pcs
C403,404	ECA1HM3R3	3.3	2
C405	400-22201-B	10	1
C406	420-10400-50	50P	1
		(CONNECTORS)	
H-CN1	540-00400	CONNECTOR, 40P	1
H-CN2	530-00020-04	CONNECTOR, 2P	1
H-CN3	530-00120-02	CONNECTOR, 12P	1
H-CN5	530-00030-01	CONNECTOR, 3P	1
H-CN6	530-00040-01	CONNECTOR, 4P	1
H-CN7	530-00040	CONNECTOR, 4P	1
H-CN8	530-00030	CONNECTOR, 3P	1
H-CN9	530-00020-04	CONNECTOR, 2P	1
H-CN10	530-00060-02	CONNECTOR, 6P	1
		(RESISTORS)	
R1,2	ERD25TJ271	270	2
R3	ERD25TJ123	12K	1
R101,102	ERD25TJ333	33K	2
R103	ERD25TJ562	5.6K	1
R104,105	ERD25TJ102	1K	1
R106	ERD25TJ562	5.6K	1
R107	ERD25TJ102	1K	1
R108,109	ERD25TJ103	10K	2
R110	ERD25TJ101	100	1
R111	ERD25TJ104	100K	1
R112	ERD25TJ102	1K	1
R113,114	ERD25TJ103	10K	2
R116	ERD25TJ562	5.6K	1
R117	312-20010	2K	1
R118	ERD25TJ221	220	1
R119	311-33040	3.3M	1
R120	310-10500	1M	1
R121	305-10400	100K	1
R201	ERD25TJ333	33K	1
R202	ERD25TJ104	100K	1
R203	EERD25TJ562	5.6K	1
R204	ERD25TJ202	2K	1
R205	ERD25TJ392	3.9K	1
R206	320-33500	3.3M	1
R301	ERD25TJ333	33K	1
R302	ERD25TJ104	100K	1
R303	ERD25TJ562	5.6K	1
R304	ERD25TJ222	2.2K	1
R305	ERD25TJ512	5.1K	1
R306	312-10040	1M	1
R307	312-14040	1.4M	1
R401	ERD25TJ333	33K	1
R402	ERD25TJ104	100K	1
R403	ERD25TJ562	5.6K	1
R404	ERD25TJ222	2.2K	1
R405	ERD25TJ512	5.1K	1
R406	312-33040	3.3M	1
R407,408	ERD25TJ102	1K	2
R409	ERD25TJ102	1K	1
R410	ERD25TJ333	33K	1
R411	ERD25TJ224	220K	1
		(SWITCH)	
SW1,2	613-00027	SWITCH	1

Ref. No.	Part No.	Part Name & Description	Pcs
		(TRANSFORMERS)	
T101	C60-09990	MOLDING TRANSFORMER	1
T201	601-00010	BIAS TRANSFORMER	1
T301	601-00011	BIAS TRANSFORMER	1
T401	601-00012	BIAS TRANSFORMER	1
		(VARIABLE RESISTORS)	
VR201	390-00004	VARIABLE RESISTOR	1
VR302	390-00004	VARIABLE RESISTOR	1
VR401	390-00004	VARIABLE RESISTOR	1
VR402	390-00005	VARIABLE RESISTOR	1
E10	C60-01340	LEVER, COVER OPEN	1
E11	C60-01510	GUIDE, COVER OPEN	1
ENGINE CONTROL BOARD PARTS			
PCB6	**P62-61020**	**ENGINE CONTROL BOARD ASS'Y (RTL)**	1
		(ICs)	
U1	PQVISN7L00N	IC S	1
U2	PQVISN7L07N	IC S	1
U3	PQVISN7L14N	IC S	1
U4	PFVIHA3532NT	IC S	1
U5	110-00620	IC	1
U6	170-00610	IC	1
U7	PQVINJM2403D	IC S	1
		(TRANSISTOR)	
U8	170-00641	TRANSISTOR(SI)	1
		(DIODES)	
D1~3	260-00001	DIODE(SI)	3
D5~7	260-00004	DIODE(SI)	3
		(CORE)	
BEAD1.2	603-00010	CORE	2
		(FUSE)	
		(FUSE)	
F11A	603-00010	FUSE	1
		(CAPACITORS)	
C6	400-10400	0.1	1
C8	440-10100-16	100	1
C13, 14	400-30000	30P	2
C15	400-10400	0.1	1
C18	420-10200	1000P	1
C19	400-10400	0.1	1
C20~22	400-10300	0.01	3
C23	440-10100-16	100	1
C28~30	400-10400	0.1	3
C32	400-10300	0.01	1
C33	440-10100-50	100	1
C34	400-10400	0.1	1

KX-FLM600G

This replacement parts list is for KX-FLM600G only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
		(CONNECTORS)	
ECN1	530-00120-01	CONNECTOR	1
ECN2	540-00340	CONNECTOR	1
ECN3	530-00050	CONNECTOR	1
ECN4	530-00080	CONNECTOR	1
ECN5	540-00400	CONNECTOR	1
ECN6	530-00030-01	CONNECTOR	1
ECN7	530-00100	CONNECTOR	1
ENC8	540-00260	CONNECTOR	1
		(PHOTO ELECTRIC TRANSDUCER)	
PC1	613-00040	PHOTO COUPLER	1
		(RESISTORS)	
R1~7	ERD25TJ102	1K	7
R8, 9	ERD25TJ103	10K	2
R10	ERD25TJ272	2.7K	1
R11	ERD25TJ100	10	1
R12, 13	ERD25TJ563	56K	2
R14	ERD25TJ222	2.2K	1
R15	ERD25TJ332	3.3K	1
R16	ERD25TJ223	22K	1
R17	ERD25TJ102	1K	1
R18	ERD25TJ472	4.7K	1
R19	ERD25TJ271	270	1
R20	ERD25TJ105	1M	1
R21	ERD25TJ203	20K	1
R22	ERD25TJ103	10K	1
R23	ERD25TJ333	33K	1
R24	ERD25TJ103	10K	1
R25	312-12020	123K	1
R26	ERD25TJ102	1K	1
R27	323-75000	750	1
R28~31	ERD25TJ102	1K	4
R32	ERD25TJ332	3.3K	1
R34	ERD25TJ332	3.3K	1
R35	ERD25TJ102	1K	1
R36	ERD25TJ513	51K	1
R37	ERD25TJ332	3.3K	1
R38	ERD25TJ104	10K	1
R39	323-01500	0.15	1
R40	ERD25TJ102	1K	1
R41	ERD25TJ751	750	1
R42	ERD25TJ332	3.3K	1
R43	ERDS1TJ000	0	1
		(CRYSTAL OSCILLATOR)	
Y1	608-00040	CRYSTAL OSCILLATOR	1
PRINTER CONTROL BOARD PARTS			
PCB7	**P62-63020**	**PRINTER CONTROL BOARD ASS'Y (RTL)**	**1**
		(ICs)	
U1	110-00611	IC	1
U2	120-00004	IC	1
U4	120-00031	IC	1
U5	120-00004	IC	1
U7	120-00031	IC	1
U9	170-00621	IC	1
U10	100-00060	IC	1
U12	170-00670	IC	1
U13	160-00750	IC	1
U14	608-00050	IC	1
U201	170-00701	IC	
		(TRANSISTORS)	
Q1	210-00010	TRANSISTOR(SI)	1
Q201	210-00023	TRANSISTOR(SI)	1
		(DIODES)	
D1	260-00006	DIODE(SI)	1
D2~18	270-00020	DIODE(SI)	17
		(CAPACITORS)	
C1~5	PQCUV1H104ZF	0.1	5
C6	PQCUV1H102J	0.001 S	1
C7	PQCUV1H101JC	100P	1
C8~22	PQCUV1H102J	0.001	15
C23, 24	PQCUV1H150JC	15P S	2
C25 ,26	PQCUV1H221JC	220P	1
C27	PQCUV1H103KB	0.01	1
C28	PQCUV1H102J	0.001 S	1
C29~31	PQCUV1H221JC	220P	3
C32	PQCUV1H104ZF	0.1	1
C33, 34	PQCUV1H150JC	15P	1
C35, 36	PQCUV1H180JC	18P	1
C37	PQCUV1H150JC	15P	1
C38~40	PQCUV1H104ZF	0.1	3
C41, 42	PQCUV1H150JC	15P	2
C43~62	PQCUV1H104ZF	0.1	20
C64~70	PQCUV1H104ZF	0.1	7
C71	PQCUV1H221JC	220P	1
C72	PQCUV1H150JC	15P	1
C73	PQCUV1H470JC	47P	1
C75	PQCUV1H104ZF	0.1	1
C77, 78	PQCUV1H104ZF	0.1	2
C201,202	450-10400-YZ	0.1	2
CT1~3	470-22600	22	3
CT4~9	470-10500	1	6
CT10	470-22600	22	1
CT11, 12	470-47600	47	2
CT13	470-22600	22	1
		(CONNECTORS)	
J1	530-00480	CONNECTOR	1
J4	530-00360	CONNECTOR	1
J5	540-00340-01	CONNECTOR	1
JP1	540-00020-00	CONNECTOR	1
J201	540-00020-00	CONNECTOR	1
J202	530-00020-03	CONNECTOR	1
		(COILS)	
L1~18	609-00007	BEAD CORE CHIP	18
L20	609-00007	BEAD CORE CHIP	1
L21	609-00004	BEAD CORE	1
L24	609-00007	BEAD CORE CHIP	1
L25, 26	609-00009	BEAD CORE CHIP	2
L201	609-00007	BEAD CORE CHIP	
		(RESISTORS)	
L22, 23	ERDS1TJ000	0	2
R1~31	PQ4R10XJ330	33	31
R33~39	PQ4R10XJ330	33	7
R40, 42	PQ4R10XJ510	51	2

This replacement parts list is for KX-FLM600G only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
R41	PQ4R10XJ330	33	1
R42	PQ4R10XJ510	51	1
R44~47	PQ4R10XJ330	33	4
R48	PQ4R10XJ103	10K	1
R54~56	PQ4R10XJ104	100K	3
R57~88	PQ4R10XJ330	33	32
R89	PQ4R10XJ103	10K	1
R90~93	PQ4R10XJ3R9	3.9	4
R94, 95	PQ4R10XJ103	10K	2
R96	PQ4R10XJ330	33	1
R97	PQ4R10XJ103	10K	1
R98	PQ4R10XJ472	4.7	1
R99	PQ4R10XJ102	1K	1
R100	PQ4R10XJ473	47K	1
R104	PQ4R10XJ562	5.6K	1
R105	PQ4R10XJF392	3.9K	1
R106-122	PQ4R10XJ102	1K	17
R123	PQ4R10XJ472	4.7K	1
R124	PQ4R10XJ102	1K	1
R125	PQ4R10XJ472	4.7K	1
R126~136	PQ4R10XJ221	220	11
R137	PQ4R10XJ102	1K	1
R138~146	PQ4R10XJ221	220	9
R147~149	PQ4R10XJ330	33	3
R150	PQ4R10XJ000	1	1
R152, 153	PQ4R10XJ330	0	2
R154~157	PQ4R10XJ104	100K	4
R158	PQ4R10XJ221	220	1
R159	PQ4R10XJ104	100K	1
R160	PQ4R10XJ151	150	1
R161	PQ4R10XJ330	33	1
R163~168	PQ4R10XJ473	47K	6
R170	PQ4R10XJ680	68	1
R171	PQ4R10XJ180	18	1
R196	PQ4R10XJ680	68	1
R201	350-22100	220	1
R202	350-12000	12	1
R203	350-10200	1K	1
		(CRYSTAL OSCILLATOR)	
Y1	608-00020	CRYSTAL OSCILLATOR	1
		(OTHERS)	
JP1	611-25402	SHORT PIN	1
BD1	601-00030	EMC FILTER	1

Ref. No.	Part No.	Part Name & Description	Pcs
		REGISTOR SENSER BOARD PARTS	
PCB8	**P60-60010**	**REGISTOR SENSER BOARD ASS'Y (RTL)**	**1**
		(CONNECTOR)	
R-CON	620-06150-01	CONNECTOR	1
		(PHOTO ELECTRIC TRANS DUCER)	
R-SEN	613-00040	SENSOR	1
		PAPER SENSER BOARD PARTS	
PCB9	**P60-60020**	**PAPER SENSER BOARD ASS'Y (RTL)**	**1**
		(CONNECTORS)	
P-CON	620-06110-01	CONNECTOR	1
		MANUAL-EXIT SENSER BOARD PARTS	
PCB10	**P60-60030**	**MANUAL-EXIT SENSER BOARD ASS'Y (RTL)**	**1**
		(CONNECTORS)	
M-CON, E-CON	620-06250	CONNECTOR	2
		(SWITCHES)	
E-SW	PFSH1A05Z	MOCRO SWITCH	1
M-SW	PFSH1A07Z	MOCRO SWITCH	1
		R.P SENSER BOARD PARTS	
PCB11	**P62-60070**	**R.P. SENSER BOARD ASS'Y (RTL)**	**1**
		(CONNECTORS)	
RP-CON	620-06140-01	CONNECTOR	1
		(SWITCH)	
RP-SW	PFSH1A06Z	MICRO SWITCH	1
P-SEN	613-00040	SENSOR	1

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Ref. No.	Part No.	Part Name & Description	Pcs
		COVER OPEN SENSER BOARD PARTS	
PCB12	**P62-60008**	**COVER OPEN SENSER BOARD ASS'Y (RTL)**	**1**
		(CONNECTOR)	
C-CON	620-06240	CONNECTOR	1
		(SWITCH)	
C-SW	PFSH1A06Z	MICRO SWITCH	1
		HOOK BOARD PARTS	
PCB13	**P62-60001**	**HOOK BOARD ASS'Y (RTL)**	**1**
		(JACK & CONNECTOR)	
CN401	PQJJ1TB18Z	MODULAR JACK	1
CN402	PQJP8G30Y	CONNECTOR, 8P	1
CN403	PQJP2G31Y	CONNECTOR, 2P	1
		(SWITCH)	
SW401	ESE14A211	HOOK SWITCH	1
		FIXTURES ANT TOOLS	
	PFJF20203128	FLOPPY DISK KIT (for Windws 95/98)	1
	PFJF20303121	FLOPPY DISK (for Windws 3.1X)	1
EC1	PFZZ18K1Z	EXTENSION CORD, 18P	2
EC2	PFZZ40K1Z	EXTENSION CORD, 40P	1
EC3	PFZZ26K1Z	EXTENSION CORD, 26P	1
EC4	PFZZ34K1Z	EXTENSION CORD, 34P	1
EC5	PFZZ12K3Z	EXTENSION CORD, 12P	1
		Note: Extension Cords are useful servicing. (They make servicing easy.)	1
	KM79811245C0	BASIC FACSIMILE TECHNIQUE (for training service technicians)	

EXPLANATION OF CD-ROM SERVICE NUMBER

PFJ K 201 00 10 1
[1] [2] [3] [4] [5]

FD service number

PFJ F 202 00 10 B
[1] [2] [3] [4] [5]

PFJ F 203 00 10 1
[1] [2] [3] [4] [5]

[1] Media (1 digit of alphabet)

K: CD-ROM
F: FD

[2] Software classification (3 digits of alphanumeric letters)

Interface name (1 digit) + Software classification (2 digits):digits of software classification consists of 1 digit of interface name and 2 digits of software classification.

The classification number of software has its own signification according to the interface name.

*When new software classification code is appeared, the classification number is increased in order.

- Interface name (1 digit of alphanumeric letter): 1 to Z
  1: Serial Cable (RS-232C)
  2: Parallel Cable (IEEE1284 printer cable)
- Classification of software, OS number, Hardware (2 digits of alphanumeric letters): 00 to ZZ
  1: Serial Cable
    01: FM220/FM260/FM280, PC FAX software (Windows 3.1x/95)
    02: FP300 series, PC FAX software (Windows 95/98)
  2: Parallel Cable
    01: FLM600 series, printer driver (Windows 3.1x/95/98)
      TWAIN driver (Windows 3.1x/95/98)
      PC FAX software (Windows 95/98)
    02: FLM600 series, printer driver (Windows 95/98)
      TWAIN driver (Windows 95/98)
      PC FAX software (Windows 95/98)
    03: FLM600 series, printer driver (Windows 3.1x)
      TWAIN driver (Windows 3.1x)

Example: Parallel Cable (printer cable), FLM600/650 series
Printer driver (Windows 3.1x/95/98)
TWAIN driver (Windows 3.1x/95/98)
PC FAX software (Windows 95/98)
→ 201

[3]Language (2 digits of alphanumeric letters): 00 to ZZ

Language number

- The letters from 0 to 9 are used when single language is supported. Start from 0. When the right digit becomes full, the left digit counts up.
- The letters from A to Z are used when plural languages are supported. Start from A. When the right digit becomes full, the left digit counts up.

Assignment table (As of June 7, 1999)

1) Single language

Language code	Language
00	English (U.S.A.)
01	English (U.K.)
02	French (France)
03	German
04	Italian
05	Portuguese
06	Spanish
07	French (Canada)
08	Polish
09	Finnish
0A	Russian
0B	Chinese
0C	English (Canada)

2) Plural languages

Language code	Language
A0	English (U.S.A.) + French (Canada)
A1	German + English (U.K.)
A2	German + English (U.K.) + Polish
A3	German + English (U.K.) + Polish + Portuguese + Spanish
A4	English (U.S.A.) + French (Canada) + German
A5	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian
A6	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian + Polish + French (France)
A7	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian + Polish + French (France) + Spanish + Portuguese

[4] Version (2 digits of alphanumeric letters): 10 to ZZ

Version number

Example: Version 1.0
—> 10

[5] Plural CD-ROM/FD serial numbers (1 digit of alphanumeric letter): 1 to Z

The number of media

1: Disk1
2: Disk2
3: Disk3
4: Disk4
5: Disk5
6: Disk6
7: Disk7
8: Disk8
9: Disk9
A: Disk10
B: Disk11
C: Disk12
D: Disk13
E: Disk14
F: Disk15
G: Disk16
H: Disk17
J: Disk18
K: Disk19
L: Disk20

Example: FD 11 media
—> C

Note: "I" and "O" of alphabet are not used not to be taken for "1" and "0" [zero] of number.